EDITED BY:
YAKUT GAZI
NELSON C. BAKER

MOVING HORIZONTALLY:
THE NEW DIMENSIONS OF AT-SCALE LEARNING IN THE TIME OF COVID-19

Foreword by: Peter Stokes
Introduction by: Mary Walshok

Yakut Gazi • Nelson Baker

Editors

MOVING HORIZONTALLY

New Dimensions of at-Scale Learning in the Time of COVID-19

Editors

Yakut Gazi
Georgia Institute of Technology
Atlanta, U.S.A.

Nelson Baker
Georgia Institute of Technology
Georgia Institute of Technology

Front and back cover art: Inara Price

Published in the United States of America

For the love and support of my parents, my husband, and my brother.
And for Inara to grow up in a just, equitable, and humane society…

Yakut

Without the love and support of my wife, Dawna, my family, as well as all of those colleagues around the world who have helped share their experiences, this journey would not be possible - thank you!

Nelson

CONTENTS

ABOUT THE EDITORS AND CONTRIBUTORS

EDITORS

Dr. Yakut Gazi worked at higher education institutions in the U.S.A., Turkey, Qatar, and Spain as an instructional designer, media specialist, IT consultant, faculty member, and technology leader since 1993. She is currently the Associate Dean for Learning Systems at Georgia Tech Professional Education, overseeing learning design and development, technology infrastructure, compliance, and assessment for credit and non-credit online courses. Prior to joining Georgia Tech Professional Education, she was the assistant vice chancellor for engineering remote education at Texas A&M University. Dr. Gazi also led the distributed learning and classroom technology operations at Texas A&M University-Central Texas. In her faculty role, she has taught courses in educational technology, foundations of distance learning, psychology of learning, theories of learning, and predictive analytics in higher education. She is on the editorial review teams of the ASEE Computers in Education, Journal of Social Media in Society, Educational Technology, Research, and Development (ETR&D), and the MERLOT Journal of Online Learning and Teaching. She is a board member of the International Association of Engineering Continuing Education (IACEE) and a member of the Quality Matters Academic Advisory Council. She is the recipient of the American Society of Engineering Education (ASEE) Continuing and Professional Development Division's 2021 Certificate of Merit. She frequently presents at regional, national, and international conferences and is the author or co-author of book chapters, journal articles, and proceedings. Dr. Gazi has a Ph.D. in Educational Psychology from Texas A&M University, and an M.A. in Educational Sciences and a B.S. in Teaching Chemistry, both from Bogazici University. A native of Istanbul, Turkey, Dr. Gazi is married, with a daughter.

Dr. Nelson C. Baker is the dean of Professional Education at the Georgia Institute of Technology and professor in the university's School of Civil and Environmental Engineering. As dean, Dr. Baker leads a multifaceted operation including the Global Learning Center, Georgia Tech-Savannah, the Language Institute, and Georgia Tech's extensive professional education programs in STEM- and business-related subjects. Dr. Baker also oversees educational outreach programs and serves as the interface between Georgia Tech's professional education activities and the industries, corporations, government agencies and professional societies that benefit from them. Under Dr. Baker's leadership, Georgia Tech Professional Education has steadily expanded, serving more than 129,000 learners worldwide and 2,600 organizations in 2020. Dr. Baker's award-winning work on the impact of technology on engineering students' learning has generated projects such as multilingual web-based intelligent simulations for problem solving, among others. Leading Dr. Baker's list of honors is the W.M. Keck Foundation Award for Engineering Teaching Excellence. He has been named an ENR Educator for Construction's Next Generation as well as an NSF National Young Investigator. He is also the recipient of the Best Paper Award from the ASCE Journal of Computing. Within Georgia Tech, he has received the Outstanding Innovative Use of Education Technology Award and the W. Roane Beard Outstanding Teacher Award. Dr. Baker serves as the Secretary General of the International Association of Continuing Engineering Education (IACEE) and is also the Past President of the University Professional Continuing Education Association (UPCEA). He is the Past-Chair of the Georgia Board of Regents Administrative Committee on Public Service and Continuing Education, and he is an active member of ASEE and ASCE. Dr. Baker graduated from the Georgia Institute of Technology in 1980 with a B.C.E. in Civil Engineering. He earned his M.S. and Ph.D. degrees in Civil Engineering from Carnegie Mellon University in 1985 and 1989 respectively.

CONTRIBUTORS

Dr. Anant Agarwal is the Founder and CEO of edX and Professor of Electrical Engineering and Computer Science at MIT. Anant won the Maurice Wilkes prize for computer architecture, and MIT's Smullin and Jamieson prizes for teaching. He is also the 2016 recipient of the Harold W. McGraw, Jr. Prize for Higher Education, which recognized his work in advancing the MOOC movement. As a CEO of a global nonprofit, Anant is helping to transform traditional education, removing the barriers of cost, location and access. edX is reimagining the possibilities of education, providing the highest-quality, stackable learning experiences including the groundbreaking MicroMasters(R) programs. Additionally, he is a recipient of the Padma Shri award from the President of India and was named the Yidan Prize for Education Development Laureate in 2018.

Dr. MJ Bishop is Associate Vice Chancellor and director of the University System of Maryland's William E. Kirwan Center for Academic Innovation, established in 2013 to create a collaborative culture of academic innovation that catalyzes new ways of thinking about student success, translates ideas into action, and scales and sustains promising practices. Informed by the diversity of USM's 12 public higher education institutions, findings from the learning sciences, and capabilities of emerging technologies, the Center leads statewide efforts to implement, evaluate, and scale and sustain innovations aimed at student success. Prior to USM, Dr. Bishop was Associate Professor and Director of Lehigh University's Teaching, Learning, and Technology Program where she was responsible for the institution's graduate programs in instructional technology and teacher education. While at Lehigh, Dr. Bishop received several awards for her research and teaching including the prestigious Stabler Award for Excellence in Research and Teaching.

Dr. Rovy Branon is the vice provost leading University of Washington's Continuum College in Seattle. UW Continuum College serves over 55,000 learners annually through 110 professional master's degrees, 100 certificates, International English Language Programs, Summer Quarter, UW in the High School, Conference Services, and the Osher Lifelong Learning Institute. Dr. Branon holds a Ph.D. in Instructional Systems Technology with a minor in Human-computer Interaction, from Indiana University. He has spoken at more than 100 conferences on the future of lifelong learning, technology and continuing education. His advocacy for increasing access to higher education and workforce development has been featured in: The New York Times, Geekwire, Fox Business, CBS Tech Republic, The Seattle Times, USA Today, Portland NBC affiliate KGW, and numerous regional publications. Dr. Branon served as board president of the University Professional and Continuing Education Association (UPCEA) 2020-2021.

Dr. Bertien Broekhans has over 25 years of experience in international higher education as an instructor, researcher, consultant, advisor, administrator, program coordinator, curriculum designer, and learner-centred learning expert. Trained as an environmental engineer, experienced as reflective practitioner, academic researcher and educator. Still fascinated by the phenomena of knowledge and learning, at the moment these converge into portfolio and product management activities at TUDelft | Extension School for Continuing Education. As professional, he would like to make a meaningful difference in innovation and improvement of the public good: searching for (contribution to) solutions for societal challenges, co-creating shared knowledge for strategies, policies, and researching informed decision making. He loves to critically interrogate, to constructively answer, coupling and combining various “sometimes surprising’” perspectives and methodologies. Skills to connect professionals, scientists and

learners interactively to confront opinions, perspectives, discourses in dialogue, research, and education all contribute to deliver an engaging learning environment for many.

Dr. Troy Courville is the Director of Assessment and Educational Insights and Interim Director of Learning Design at Georgia Tech Professional Education (GTPE). Prior to his tenure at GTPE, he was the Assistant Director of Clinical Psychometrics at Pearson (2015-2017), and held various roles at Texas A&M University-Central Texas (2009-2015) with the last being Assistant Provost and Associate Vice President of Academic Affairs. He has contributed to several assessment instruments, including the Wechsler Intelligence Scale for Children-Fifth Edition (WISC-V) , Scandinavia, California Verbal Learning Test-Third Edition (CVLT-3), Wechsler Intelligence Scale for Children-Fifth Edition (WISC-V)-Netherlands, Wechsler Preschool and Primary School Scale of Intelligence-Fourth Edition (WPPSI-IV), Wechsler Nonverbal Scale of Intelligence (WNV), and several international adaptations. He also served as the lead psychometrician for the English version of the Texas Assessment of Knowledge and Skills (TAKS). He received his Ph.D. in Educational Psychology from Texas A&M University.

Thomas Hoover is the Chief Information Officer at Louisiana Tech University in Ruston, Louisiana where he is responsible for creating and implementing the technology vision. He has also served as Chief Information Officer and Dean of the Library at the University of Louisiana at Monroe (ULM) and as Associate Vice-Chancellor and Chief Information Officer at the University of Tennessee at Chattanooga (UTC). Thomas has worked in Information Technology in higher education since 1999. Prior to his appointment at ULM and UTC, he served as the Director of Instructional Technology Support at Pepperdine University in Malibu, California. He is working on his doctorate in educational leadership at Louisiana Tech University. Thomas was born in southern California and has a Bachelor's degree in Political Science and History from the University of California at Davis and a Master's in Public Policy from Pepperdine University's School of Public Policy. He is married and has five children. He enjoys golfing and traveling.

Dr. Donna Johnson currently serves as the Assistant Vice President for Academic Advancement & Partnerships for Louisiana Tech University, where she oversees the Louisiana Tech Academic Success Center in Bossier City, the Tech Barksdale Program, and the Tech Shreveport Center. Dr. Johnson was formerly the Executive Director of Caddo/Bossier Partnerships and Military Outreach for Northwestern State University. Prior to working in higher education, she was a secondary English teacher in Texas and Louisiana public school systems. Through her career Dr. Johnson has managed multiple university expansion and development initiatives, bolstered educational advancement in support of the DoD, and assumed teaching roles with Louisiana Tech, Northwestern State, Bossier Parish Community College, and Ashford University. Dr. Johnson has been active in service to the University and community through participation on various committees and work groups, including serving as President of Open Arms Adoptions, serving on the State Taskforce for Adult Learners, serving on the Louisiana Women in Higher Education (LAWHE) state steering committee, and serving on various committees with the Shreveport and Bossier Chambers of Commerce. Dr. Johnson holds a Bachelor of Science in Occupational Education from Wayland Baptist University, a Master of Education from Wayland Baptist University, a Master of Arts (English) from Northwestern State University, and a Doctor of Education from Louisiana Tech University.

Dr. David Joyner is Executive Director of Online Education and Online Master of Science in Computer Science (OMSCS) in Georgia Tech's College of Computing. His research focuses on online education and learning at scale, especially for-credit at the graduate and undergraduate

levels. His emphasis is on designing learning experiences that leverage the opportunities of the online environment to compensate for the loss of synchronous collocated class time. As part of his work, Joyner instructs several online graduate and undergraduate classes, teaching over 15,000 for-credit students since 2015. Joyner has received several awards for his work in teaching online, including the 2019 University System of Georgia's Regents' Teaching Excellence Award for Online Teaching, 2018 Georgia Tech Center for Teaching & Learning Curriculum Innovation Award, and the 2016 Georgia Tech College of Computing Lockheed Excellence in Teaching Award. Joyner's book on the future of online learning, The Distributed Classroom (co-authored with Charles Isbell), will be released in Fall 2021 by MIT Press.

Janine Kiers is Business Team Manager at the TU Delft Extension School for Continuing Education. She oversees the educational portfolio for professional learners, and aligns the content, format and learning experience to meet the needs of this specific target group, while balancing this with the university's objectives of educating the world, improving campus education, growing reputation and use in research. Setting up online learning at TU Delft virtually from scratch, she has worked on course development, teacher training, process management, implementing change and product & portfolio management, resulting in approaching 200 courses, varying from individual MOOCs and Professional Education courses to Professional Certificate programs, in English and in Spanish. With a background in Biology and Bio-engineering, she has international working experience in industry and academia, ranging from production development at a biopharmaceuticals manufacturer and institutional development in a Filipino university to setting up and teaching in innovative courses and programs in Life Science & Technology at the industry-academe interface.

Dr. Jeonghyun (Jonna) Lee is a Research Scientist II and serves as an Assistant Director of Research in Education Innovation at Georgia Institute of Technology's Center for 21st Century Universities (C21U). Her expertise is on the relationship between a range of instructional practices and students' learning motivation and engagement from behavioral, cognitive, and socio-cognitive perspectives. Based on her background as a learning scientist, Lee is interested in how the application of technology facilitates effective learning as well as student success in higher education settings. She received her master's and doctoral degrees from the University of Texas.

Matt Lisle is the Director of Digital Learning Technologies at the Center for 21st Century Universities. He brings a combination of professional and academic experience in the fields of instructional design, web design and development, and content strategy to his work. His main professional focus is the creation and development of technology-enhanced learning experiences. He received his bachelor and master's degrees from the University of Georgia.

Dr. Martin Maurer holds a master's degree and a PhD in Human Resource Education from the University of Illinois at Urbana-Champaign. Formerly the director of the University of Illinois' online Master of Science in Accountancy program (iMSA) and the Margolis Market Information Laboratory, he currently works as the Director of eLearning for Accreditation and Online Initiatives at the University of Illinois' Gies College of Business. His academic training and research focused on training and development in business and organizational settings, and his dissertation research explored the impact of team dynamics on quality improvement initiatives in the health care industry. His prior work has been published in the Journal of Knowledge Management and in the Action Research journal.

Nancy O'Neill Nancy O'Neill has been with the University System of Maryland's Kirwan Center for Academic Innovation since 2016. She supports an array of the Center's projects, including work in alternative credentials and open educational resources. She leads the Council for the Advancement of Teaching and Learning (CATL), an advisory group to the Center. Previously, she directed the teaching and learning center at the University of Baltimore from 2012 to 2016 and before that spent a decade on the senior staff at the Association of American Colleges and Universities (AAC&U). Nancy earned a master's degree in American Studies and a master's degree in College Student Personnel from the University of Maryland, and a bachelor's in journalism and social criticism from the University of Buffalo. She is currently a doctoral student in higher education management at the University of Pennsylvania, where her dissertation is focused on how faculty use open educational resources in relation to their teaching practice.

Dr. Kelly Otter is Dean of Georgetown University's School of Continuing Studies (SCS). In this role, she oversees professional graduate programs; liberal studies programs at the undergraduate, master's and doctoral levels; professional certificates and custom education; summer and special programs. She previously served in academic leader roles at Northeastern University, the University of Pittsburgh, the College of New Rochelle, and New York University. Her portfolio comprises academic program development, international education and partnerships, the design and management of technology-mediated education infrastructures and programs, adult and workforce education, and global business and program development. Dr. Otter is a member of the University Professional and Continuing Education Association (UPCEA) and has taught in the fields of media studies and interdisciplinary research.

Dr. Shenita Ray is the Vice Dean for Education and Faculty Affairs at Georgetown University's School of Continuing Studies. Before her current role, Ray was the Senior Associate Dean for Faculty and Academic Affairs and Director of Online Operations in the School of Continuing Studies at Georgetown University. This followed working at Virginia Union University as the Director for Distance and Continuing Education and the University of Wisconsin where Ray was the Associate Director Distance Learning Center and the Director for Midwest Culturally Inclusive Conference. Prior to her career in higher education, Ray worked for General Electric as a BlackBelt and as an Information Technology leader as part of the company's Information Management Leadership Program. Ray earned her BS in Finance and Information Technology and her M.Ed. in Curriculum and Instruction from Marquette University. She earned a PhD in Educational Leadership and Policy Analysis from University of Wisconsin- Madison.

Dr. Norma Scagnoli has been involved in educational innovations as a researcher and instructor for over 20 years. At present, she is the Assistant Vice-Chancellor of Enterprise Learning Innovation at Northeastern University. She was formally the Chief Learning Officer and Research Associate Professor at the Univ of Illinois at Urbana-Champaign. In her career, she has focused on the use of technologies to improve learning opportunities and access to education, including the design of online degrees such as IMBA and other MOOC based initiatives. An instructional designer at heart, she has investigated the impact of learning designs in new environments and how they apply to adult education and development. Dr. Scagnoli holds a master’s degree in Education and a Ph.D. in Human Resource Development. Her contributions to the discipline can be found in national and international research publications.

Dr. Jennifer Schwedler serves as the Associate Dean, Online Leaning for Continuing and Professional Education at the University of California, Davis. She provides strategic direction to the team responsible for creating instructional experiences that support the delivery of high-

quality online learning of credit and noncredit academic programs. She collaborates with faculty and academic leaders across the Division and the Campus on new programs, including selection of delivery channels, instructional design and technology, learner assessment and engagement, faculty and student support, faculty development and learning analytics. She holds a doctorate in Educational Leadership and Management from Drexel University. Before joining UC Davis, Dr. Schwedler held several academic technology and design leadership positions at California State University, Sacramento, most recently serving as associate vice president of Information Resources and Technology.

Dr. Karen Sibley served Brown University as an and action-oriented leader building new programs and policy/action initiatives of key significance to the University for over 38 years. Most recently, she provided guidance for the provost's strategic plan, Brown and the Innovation Economy. She served as Brown's board representative for the new RIHUB at the Innovation Center in Providence and worked with a range of stake holders from faculty and students at Brown, to government, industry and other educational institutions and non-profit organizations. She served as a key conduit and organizer for members of the campus community to connect with regional entrepreneurial, business and government leaders. She was a member of the provost's strategic planning team for 20/21 curriculum design and faculty support online instruction during the Covid-19 pandemic. After many years as dean for summer and pre-college programs, Karen served from 2014 – 19 as the inaugural dean for Brown's School of Professional Studies, creating and managing a portfolio of executive master degrees as well as continuing to oversee undergraduate and pre-college summer programs enrolling over 7,000 students in residential, blended and online courses. Dean Sibley is a forward-thinking academic leader eager to use innovative design, evolving technologies and dynamic circumstances to develop access to high quality learning opportunities for life-long higher education students. VP Sibley has also been involved in leadership across campus including co-chairing the Department of Education with particular responsibility for the Master of Arts in Teaching program, chairing and serving as a member of many senior level search committees and strategic planning task forces. She held national leadership roles as president of both the University Professional and Continuing Education Association and the North American Association of Summer Sessions. During her long career in higher education, she was involved in many institutional responsibilities including multi-institution collaboration and degree design, accreditation, organizational administration, student affairs, international programs, career development and public service engagement. Sibley completed her Doctorate in Higher Education Management from the Graduate School of Education at the University of Pennsylvania, a Master of Arts in Teaching from Brown University and received her bachelor's degree magna cum laude from the University of Massachusetts at Amherst.

Dr. Tim Stevens is an interdisciplinary scientist with expertise on media, education and the information society. He studies the role of information and communication technologies in education development and societal change. Tim has a passion for building bridges; across the sciences but also at the interface of science, education and society.

Dr. Peter Stokes is a Managing Director in the higher education practice at Huron Consulting Group. His work with colleges and universities focuses on strategy, innovation, and growth efforts. He has previously served at Vice President for Global Strategy and Business Development at Northeastern University, and as Executive Vice President and Chief Research Officer at Eduventures.

Dr. Arun Surendran is the Strategic Director and Principal of Trinity College of Engineering Trivandrum where he pioneered faculty entrepreneurship. While doing his PhD in Aerospace Engineering, he was awarded the prestigious Eppright Outstanding International Student award, the highest honor given by the Texas A&M University to any international student. Dr. Arun is the Honorary Fellow for Robotics for the Kerala Startup Mission, the state government body for promoting entrepreneurship. He is one of the founder directors of Adcy.io Cybersecurity Solutions. Dr. Arun consults for numerous multinational companies, non-governmental and governmental agencies. He works with Rotary School for Special Needs Children, Coin A Day Childcare Foundation, and the Greenvalley International School. He has authored two books The Startup Habit and The 7Cs of Entrepreneurship.

Dr. Vinod works with the Government of Kerala as the Chairman of Local Government Commission. In the last few years, he has been actively engaged in the capacity building of local level leadership and in designing systems and strategies in the area of Local Governance in India. He holds PhD in Anthropology with a fellowship from the University of Zurich. Dr. Vinod has worked extensively in various research and academic organizations including South Asian University, Indira Gandhi National Open University, Institute for Human Development, Delhi, Centre for Development Studies and International School of Dravidian Linguistics, Thiruvananthapuram, Kerala. Trans-disciplinary and interdisciplinary approaches to knowledge and its social uses are his core area of interest.

Paul Walsh came to the University System of Maryland after 12 years at the University of Baltimore where he served as Associate Vice President and Director of the Office for Academic Innovation. He now works as the Kirwan Center's Program Director for USMx, a system wide effort to expand access to affordable, high-quality educational opportunities through at-scale and innovative online courses and programs. Paul collaborates with system institutions to instill a culture of collaboration, develop market- and mission-driven courses, and conduct groundbreaking research. Paul has led USM's efforts in the development of numerous MicroMasters(R) and Professional Certificate programs on the edX platform. He has developed and taught online courses of all types, written policy and strategic plans for online growth, led institutional committees through LMS platform searches and implementations, and established an e-Learning Center and a Center for Excellence in Learning, Teaching and Technology.

Dr. Mary Walshok is a thought leader and subject-matter expert on aligning workforce development with regional economic growth. She has authored more than 100 articles, reports, and book chapters on regional innovation, workforce development and the role of research institutions in regional economies. As an industrial social scientist focused on the dynamics of regional economic development and transformation, Walshok has studied various communities across America. She has evaluated 13 WIRED regions funded by the U.S. Department of Labor, studied three innovative regions for a National Science Foundation-funded project and assessed one region's efforts to grow an industry for a Lilly Foundation-funded endeavor. As head of the continuing education and public programs arm of UC San Diego since 1981, Walshok oversees programs that educate more than 100,000 enrollees annually, which translates to more than 30,000 students in over 4,400 courses. Walshok has developed outreach efforts to help accelerate the San Diego region's economic vitality, grow the region's globally competitive talent pool and help college graduates transition to high-demand employment areas. She also helps provide access to a vast array of regional intellectual resources through the award-winning UCSD-TV and nationwide through UCTV. During her tenure, Walshok has played an active role in helping the University expand its local impact,

national reputation and global reach. She is the recipient of numerous awards including the Kellogg Foundation's Leadership Fellowship and was inducted into Sweden's Royal Order of the Polar Star. She currently serves on the boards of San Diego CONNECT (which she helped found in 1985), the La Jolla Playhouse, the United States-Mexico Foundation for Science, the Institute of the Americas, the San Diego Opera and the Girard Foundation. A native of Palm Springs, California, she received her bachelor's degree in sociology from Pomona College in 1964, her master's degree in sociology in 1966 and her Ph.D. in sociology in 1969 from Indiana University. She has been a visiting professor at the Stockholm School of Economics for many years and in 2004 held an international appointment in the department of continuing education at Oxford University in England.

Ulrike Wild is Programme Director of Educational Innovation at Wageningen University & Research. She has a very diverse career: being a trained classical musician and psychologist she worked as freelance musician and music teacher, trainer, consultant and business developer for occupational psychology; before turning to digital innovation in Higher Education. At Wageningen University and Research, she is responsible for the development of the open and online program, consisting of MOOCs, online degree programs and online courses for professionals. She also leads a national program for flexibilization of Higher Education. This program comprises for instance a pilot project for a new national administration fostering student mobility and introducing microcredentials in the national system.

FOREWORD

Peter Stokes

Moving Horizontally is a timely history of the very recent past, one in which the world of higher education was suddenly and thoroughly challenged to reinvent itself by the rapidly evolving threat of a global pandemic. Its dozen stories reflect diverse vantage points on this moment, and summarize actions undertaken across universities, professional schools, administrative units and centers, and consortia, drawing on experiences at a variety of U.S. public and private institutions, as well as at a handful of institutions in Europe and South Asia. In the telling, we see how this moment underscored both our collective capacity for adaptation, as well as the stubbornness that can inhibit us from realizing the full potential of new ways of teaching and learning. Along the way, this moment has unquestionably invited us to reconsider what we value most when it comes to education and the opportunities it creates for individuals, communities, and nations. We should not be surprised, then, that lasting effects from reflections of this type may take some time to sort themselves out.

Among the questions that remain to be answered are these: what lessons will higher education draw from this experience and this history? How might the remarkably rapid adaptations in our approach to instruction, often achieved in a matter of days or weeks and under the threat of almost unprecedented public health, economic, and social crises, leave a lasting mark on the future of higher education? What, in other words, has Covid-19 taught us about higher education? And what will we do differently as a result?

It is widely recognized that the pandemic has acted as an accelerator of a wide variety of longstanding trends in higher education – some good and related to innovation, others more challenging and related to demographic, economic, and operational pressures. It remains as yet unclear whether the cumulative effects of this moment will, on the whole, push the majority toward greater comfort with innovative educational practices or, conversely, precipitate a kind reactionary recommitment to the old ways of doing things – among faculty, administrators, students, parents, or the global education community at large. As the essays in this volume

Huron Consulting, pstokes@hcg.com

suggest, the near-term outcome may be positive, negative, or mixed. Even still, the aspirations expressed by these stories of rapid transformation are clear, and they reflect a shared confidence that, in the long-term, the lessons from this moment in history will improve education in important ways, from its quality to its accessibility.

This book focuses on diverse efforts to repurpose what we might, in all fairness, still think of as relatively marginal innovative educational practices (such as technology-enabled delivery models supporting part-time study for working adults via a more articulated and routinized set of course design, instruction, and assessment activities) to suddenly meet the needs of the vast majority of learners at the core – or, in fact, almost all learners, everywhere. This is what is meant by "moving horizontally."

Scale, in this version, is not defined as increased power in a node of a network (such as a master's program or MOOC enrolling growing numbers of students) – that would be vertical scale. Here, scale is achieved via a proliferation of nodes across the network (touching all disciplines, program-types, audiences, and services units at once) – that is horizontal scale. It is arguable whether one or the other form of scale is intrinsically more difficult to achieve. But within the context of higher education – that is, its history, traditions, and values – I think we can confidently make the case that while pockets of innovation characterized by vertical scale have not been unwelcome, horizontal scale has been much harder to achieve, no doubt because its effects are far more thoroughgoing and disruptive to the campus community, the traditional organizing paradigm of the university, and even to its identity. What becomes clear through the stories told in the course of this volume is that experience with vertical scale better positions the institution to attempt to realize horizontal scale.

Of course, "scale" itself has no absolute value. It is not a destination with a specific set of coordinates. There is no threshold after which, say, a certain degree program can be said to have achieved scale. The concept of scale represents a way of framing a reflection on an activity's relative reach, impact, and rate of growth. Scale in the abstract is neither good nor bad. In education, some learning experiences should preferably possess the characteristics of the small-scale, whereas for other audiences in other settings learning experiences may be preferrable at the large-scale. Ultimately, seeking greater scale should be in service of overcoming constraints that limit the impact we, as educators, desire to achieve. If we want to bring greater numbers of educational opportunities to the world at low- or no-cost, then MOOCs represent one viable way of achieving that impact, but no one would argue that MOOCs are the best education delivery model in all contexts.

To the extent, then, that we want to promote moving horizontally, we want to be able to show what education goals this is in service of, and we want to be able to show that it can be achieved while maintaining and even strengthening the core values of the institution. This, in fact, is precisely the rare opportunity that Covid-19 has presented to us.

Much of the educational innovation we can point to today originated at the margins of the university. Whether we want to talk about program innovation, or pricing, or instructional, or assessment, or other forms of innovation, much of this experimentation took root in divisions of continuing and professional education, or in extension schools, or in outreach units. It is common for the buildings housing these divisions, schools, and units to sit – literally – on the margins of campus, not infrequently across the street or even down the road. But in these somewhat distant corners of campus, a great deal of invention has been taking place for decades and decades, while at the center of campus things have often remained largely the same, sometimes for century upon century.

In more recent times, the relevance and value of these innovative units has become clearer to many institutional leaders. As the market for part-time baccalaureate and graduate education, as well as non-credit educational programs, has grown – among alumni and working professionals in regions where these institutions are situated and beyond – the rationale for building a capacity to effectively deliver lifelong learning has become clearer and clearer. As a result, a growing number of universities have been seeking to couple the vertical scale achieved by their innovation units with horizontal scale across the institution to bring the benefits of certain innovative practices closer to the core.

For highly decentralized, top tier universities with a strong commitment to research, this work has not been easy. For some, the work has only begun quite recently but has been rendered more urgent by the pandemic. Indeed, it is still unfolding. Growing numbers of universities are seeking to better understand the full range of innovative practices emerging or maturing in various corners of campus, and so they are conducting inventories of novel course designs, delivery models, technology capabilities, marketing capacity, automated services for students, and many other competencies. They are also segmenting the diverse audiences they serve, by age group, professional aspirations, geography, and more. They are establishing new governance structures to coordinate and oversee the maturation and expansion of these innovative competencies across academic divisions, IT offices, libraries, centers for teaching and learning, and other institutional units, as well as across an increasingly diverse set of partners (including OPMs, consortia, student service providers, and others). And they are

seeking to retrofit a shared vision for the expansive pursuit of these innovative practices across the institution to be achieved by moving horizontally.

The lessons highlighted in these essays provide useful roadmaps for achieving this horizontal movement. While the response to the pandemic required institutions to move at a tremendously accelerated pace, no one would argue that this pace was ideal from a design perspective. Surely everyone would have benefited from having more time, in a certain sense. But in another sense, the forced urgency of the pandemic response created a prompt like no other, and it brought vast numbers of faculty and administrators, many of whom had neither taught in a distance delivery context nor worked from home, into an immediate and immersive learning experience of their own that was in itself productive, helping them to see the benefits of innovative delivery models while also providing new insights about the value of traditional approaches to instruction.

To help their colleagues manage this unprecedented transformation, the authors of these essays and their colleagues moved rapidly to create repositories of actionable reference materials and guidebooks, to establish working groups and project teams, to build course templates and provide access to diverse technology tools, to stand up faculty mentoring programs and helpdesk services, to provide train-the-trainer instruction to help with the rapid dissemination of effective instructional practices, and to organize rigorous quality assurance and assessment strategies to ensure that the core educational mission was being met.

The results, assuredly, were nothing less than heroic at institution after institution, given the short time allotted for these efforts. Before the onset of the pandemic, who would have thought this possible? And yet, as many of the essays here readily acknowledge, alongside the numerous successes realized, the authors encountered stubborn challenges: students who were often unhappy with their remote instruction experiences, technologies that were not as easily deployed or scaled as hoped, and certain faculty who took the path of least resistance, offering limited direct engagement with their students. However much has been achieved in moving horizontally since the start of the pandemic, the stories told here – to their credit – do not shy away from underscoring how much ground still remains to be covered.

The process of defamiliarization can be a productive one, even as it inevitably prompts a certain degree of anxiety. In having to transform the way education was delivered so rapidly following the onset of the pandemic, we learned much about what is possible and also about what remains central to our values as educators. Those teaching online for the first time may well have found themselves – as has often been the case – reflecting on their traditional in-person instructional strategies in new and creative ways. But equally, those who have been

doing the work of innovating education delivery for years or decades may well have found themselves reflecting anew on what it is that makes an online a course an effective space for learning.

Unexpected lessons are a natural consequence of experimentation. Thus, the essays in this volume trace an arc from the effort to achieve horizontal movement to reflecting on what it will take to make the effects of that movement lasting and productive. To that end, we as readers and fellow travelers on this same path need to consider what it means to seize an opportunity to deploy innovations at scale. For whose benefit, and to realize whose interests are we moving in this direction? As noted by Gazi, Baker, and Sibley in this volume's closing essay, the pursuit of scale in the context of high quality, accessible education programs is really only beginning – and equitable access to education is a key motivation for pushing in this direction. Though a good deal of progress has been made, much work remains to be done, and the conversations prompted by these essays, and by others being written and published elsewhere, will undoubtedly play a formative role in advancing that work.

The great lesson for higher education to draw from the COVID-19 pandemic may well be one related to the importance of intentionality in designing and delivering educational experiences – that is, student experiences. For each student, for each audience, what scale will best meet the educational goals in that specific context? The opportunity outlined in these essays is for a broad reflection across the higher education community, nationally and globally, on the experience we have gained in undertaking both vertical and horizontal scale, and to draw upon that experience to envision a path forward for higher education informed by a deeper understanding of the most effective and efficient education design and delivery practices to best serve our many diverse student audiences and to provide the best student experience possible.

EDITORS' OVERVIEW

Yakut Gazi[a] and Nelson Baker[b]

The year 2020 will go down in history as an "unprecedented" time, marked by the public health crisis caused by the SARS-CV-2 (coronavirus) and the resulting disease, COVID-19. In responding to this emergency, many of us in higher education found ourselves in a remarkable effort to prepare our institutions for emergency remote course delivery. Those divisions and units that carried out the online and professional education operations for their institutions received a stronger call to duty than ever before.

While some of us in these units have been in the forefront not only online but also of at-scale and affordable learning, especially since 2012, "the Year of the MOOC", the scale of which we have been leaders has largely been a "*vertical*" scale, where we built *a limited number of programs and courses that sustain a vertical growth of enrollments*. Responding to this global health crisis on our campuses on the other hand, entailed wide collaboration and coordination of not only technological capabilities but also human talent distributed across our institutions, to be able to quickly pivot to a *"horizontal" scale of many students distributed over many courses, taught by many faculty*.

As leaders of at-scale affordable learning, we have impressive and complex technology infrastructures and the people know-how distributed in our organizations on how to create programs that respond to a large need in the marketplace, design and produce courses and learner experiences for these programs, find and implement innovative technologies to deliver them, achieve program affordability and financial sustainability, while ensuring data privacy (FERPA, GDPR, etc.), and protecting and promoting our institutional educational quality and brands. In many cases, it is these successes that caused our institutions to turn to us to lead, coordinate, or contribute to the COVID-19 emergency delivery of courses. How did we respond to this challenge? How did we fare? Now that everyone is online, how will the future of our vertical and horizontal scaling efforts look? What can we learn from these efforts that will enable better responses for the future, not just in times of pandemics or emergencies, but always?

[a] Georgia Institute of Technology, yakut@aggienetwork.com, ORCID: 0000-0001-6988-1887
[b] Georgia Institute of Technology, nelson.baker@pe.gatech.edu, ORCID: 0000-0001-9913-3230

This book is an international compilation of institutional responses to the "horizontal scaling" of remote and online delivery of courses. Each chapter gives the context of activities at each institution/organization, followed by the strategy or operational tactics of the coordinated emergency response, highlighting successes, sharing lessons learned, charting future ambitions. The goal of this book is to distill strategies for responding to the need to quickly pivot and meet the needs of a horizontal scaling of learning as a result of emergencies.

Mary Walshok introduces us to the book with a thoughtful strategic view on the meta forces that are shaping the higher education institutions and the pressures that COVID-19 exacerbated. Section I presents two specific examples of how previous tools and approaches that were utilized for the vertical scaling up of programs benefited Georgia Institute of Technology and University of Illinois Urbana-Champaign to horizontally scale remote delivery. These two institutions became forbearers of the affordable at-scale learning realm with their groundbreaking Online Master of Science in Computer Science (OMSCS) in 2014 and on online MBA (iMBA), respectively. Many programs followed since then.

Section II exemplifies strategies and tactics involved pre- and during COVID to respond to the horizontal scaling of remote learning at Georgetown University, University of California at Davis, and at Louisiana Tech University. These are not only starkly different types of higher education institutions, but they were also at varying levels of maturity in terms of infrastructure and services for remote delivery when COVID-19 hit these institutions. Each of their journeys uses an interesting lens through which these stories are told; pivoting while staying true to the Jesuit values, pivoting of a continuing education unit to serve the broader institution, and building the infrastructure from scratch, leveraging the new human and infrastructure resources.

Section III takes the activities and examples of COVID-19 and posits a broader perspective of a culture of continuing innovation, inquiry, and progress. The Kirwan Center for Academic Innovation masterfully weaves their typical approach to innovation that is grounded in problem solving and thoughtful experimentation into their pivot to serve the varying components of the University of Maryland. The Center for 21st Century Universities researchers describe how yesterday's pilot studies at Georgia Tech serve today's crises, stressing the importance of continuing research and development culture for tomorrow's issues, large or small. The Dutch higher education administrators shed light on what innovation looks like in a context where growth is not fueled by financial concerns as a result of public-financed higher education.

Section IV brings the concept of scale to the forefront again. We first start with a story of scaling for learning at a place where scale is in the DNA. The early stages of recognition for the education needs in Kerala and the value it brings to society provided an excellent background,

which in combination with preparations for scale with technology placed this Indian state in a position to respond quickly and quite effectively. There are lessons here for all, especially in the coordination and collaboration across government and NGO entities and efforts. The authors bring us a concept of scale in the state of Kerala that we do not experience within our local educational systems. An at-scale learning platform leader, edX, makes a case for how the move to blended education is now on an accelerated track that will irreversibly change education to a blended modality and will be here to stay post-COVID. The University of Washington's approach concludes the institutional stories with a unique perspective on scaling not only learning but also the other aspects of horizontal delivery of education, such as learner services, engagement, career services, which all need to operate at-scale now and in the future but retain the personalization to each individual.

The book culminates with a perspective on not only our experience at Georgia Tech with vertical and horizontal scaling of learning, but also our thoughts on the role of affordability and scale for the future of learning in a post-COVID world.

We thank all the authors who trusted us with this project and contributed during an unprecedented year and at a time when all of us were engaged in keeping our entire institutions going. Similarly, our peer reviewers dedicated their time, probably taken away from their mental health activities or their family, to be able to support this project. We are indebted to Steve Balfour, Sarah Dysart, Paul Huckett, Shubha Kashyap, Diane Landsiedel, Paul Marca, Ali Ogilvie, Kim Scalzo, Jennifer Schwedler, and Lisa Stephens for serving as peer reviewers. We would like to also recognize Karen Sibley for her immediate support and encouragement for this project, as well as providing editorial input. Special thanks go to Peter Stokes, who has been an invaluable partner for years and provided the thoughtful foreword to this volume.

Many of our colleagues believed in the concept of vertical and horizontal scaling of learning, the premise of this volume, and how it could benefit our profession. We listened to and were enlightened by our colleagues from all around the world through organizations such as International Association for Continuing Engineering Education (IACEE), University Professional and Continuing Education Association (UPCEA), American Society for Engineering Education (ASEE) Continuing and Professional Development Division (CPDD), Quality Matters, EDUCAUSE, and others.

We would also like to thank Peggy Alptekin for her initial and profound guidance on editing and Serhat Kurt for the countless hours of planning, editing, and formatting work.

Last, but not least, we could not have done this work without our family's unwavering support for us throughout our careers, but certainly especially during this year of the pandemic, 2020.

INTRODUCTION

The Social and Economic Imperatives Driving the Need to Scale Access to Education and Training Across the Lifespan

Mary Lindenstein Walshok

Abstract

This chapter "sets the stage" for the substantive chapters in this book. It describes the meta forces shaping the who, what and how higher education institutions can continue to be relevant and responsive in a rapidly changing world. Demographic shifts, accelerating technological change and the forces of globalization are creating significant pressures on higher education institutions to provide accessible and inclusive education across the lifespan. The essays in this volume provide clues to how institutions of higher learning can engage these new imperatives.

Keywords: Lifelong learning, technology, globalization, demographic change, re-engineering education, alternative credentialing, regionalism

Introduction

The spring and summer of 2020 will long be remembered as a moment in time when the floodgates of change were opened and millions of citizens began to recognize that the world is affected by multiple forces beyond our control: pandemics, hurricanes, floods, forest fires, and equally important simmering social unrest and massive responses to social injustice which can completely derail everyday routines and common practices. In such a world, much of what has always been taken for granted is challenged. People are looking for new knowledge, new facts, and new perspectives on how to understand what is happening. People are also being challenged in terms of their core identities, the work they do, where they work, how they work and, as importantly, how major events like pandemics and natural disasters might reshape what they do and how they do it moving forward. In such a context, colleges and universities across America are being called upon to respond in multiple ways; helping to renew the economy, navigating health issues, facilitating people getting back to work, and properly educating not just children and young adults but adults across the lifespan, all of whom are affected by these precipitous changes.

If ever a discussion about new modalities and forms of education were needed, it is at this moment in time. Individuals, institutions and communities are struggling to assess what will

University of California San Diego, mwalshok@ucsd.edu

be “the new normal” and how can we be ready for it. University researchers, scholars and professors have much to contribute to understanding these forces. But, they also need to take action now to help American citizens and industries not only adapt to, but embrace this change. This collection of essays could not come at a more propitious time. From a variety of perspectives and experiences, it addresses innovations in the content, organization, and delivery of education and certifications. Each represent viable paths moving forward in this moment when education and re-education, competency development and certification across the population are essential to all forms of work.

The goal of this chapter is to establish the context, clarify the raison d’être, the need for new models of teaching and learning, of thinking and doing in order to address the uncertainties, the fact of continuous change and the promise of new opportunities across society. With that comes the equally urgent need for rapid change in how colleges and universities build their capacity to educate and credential growing numbers of people across the lifespan. The Lumina Foundation (2020) forecasts that by 2025, barely four years from now, 60% of working age Americans will need to possess some kind of post-secondary credential in order to be employed while today that is 52%. A recent study by the Brookings Institution and ITIF (2019) reports that over the last ten-year period five cities (San Jose, San Francisco, Boston, Seattle and San Diego) have been responsible for 80% of the new tech jobs created in all the United States. And, Osterman and Weaver (2016) in their study of employers’ perceptions and satisfaction with community colleges (the putative workforce development system for American industry) revealed that barely 25% used or are satisfied with the results. Clearly, we as a nation need to seed and nurture innovation more widely *and* we need better, faster ways to upskill our workforce especially in technical fields. America can only meet these challenges by identifying competency clusters in high demand industries and designing education and training that can be organized and delivered through accessible and scalable delivery modes.

In other words, a challenge of this magnitude cannot be addressed without including a wider range of education providers, especially universities. The issue we need to address is how these knowledge-rich institutions can innovatively deliver education as well as scale these innovations. How to scale what is already in the curriculum in a manner which is qualitatively equivalent, affordable, and accessible is one issue. The work of Georgia Tech’s online Master’s degrees in this space is exemplary. How to assure access to competency development and upskilling across the lifespan in a wide range of diverse technical and professional occupations is another issue. Extension programs across the University of California system serve 400,000

enrollees annually in on-line and hybrid certificate programs for post-baccalaureate adults. This is another superb example of scaling. And, assuring advanced management and leadership skills across industries is another part of the equation. MIT is offering mini-Master's degrees through a network of universities around the globe which represents yet another scalable model.

What the reader will learn is that colleges and universities across the globe are already responding to the need for change in how content is developed, organized, and presented, utilizing multiple formats and technologies to assure that those in need of new knowledge and competencies can easily access it. The chapters which follow describe a variety of innovative credentialing programs that provide examples of what is possible. For more than a decade, a national discussion has been evolving about the need to refocus university education, not in a manner that abandons the enormous benefits of residential, liberal arts colleges and research universities but in a manner that amplifies their capabilities and reach. The need for amplification is driven by three critical imperatives: 1) globalization, 2) rapid changes in technology, and 3) significant social and demographic shifts. Each has profound implications for economic and community well-being, as well as who needs to be educated and trained and what kinds of education and training will be needed across increasingly diverse enterprises and geographies.

Key Drivers of the Need For Scaling

Globalization

Let's begin with globalization. Increases in globalization are a consequence of extraordinary advances in communications, transportation, and productive capacity which were fueled by the significant advances in technology in the post-World War II decades when R&D investments, both public and private, grew exponentially. These gave rise to new products and processes which transformed the world profoundly, particularly in the production, marketing, distribution, and servicing of products. In a mere 50 years, the economic foundations of America have evolved from a primarily industrial, within country economy, into the information age with the rapid expansion of global production and trade. The recent growth of the digital economy has connected us in ways never imagined, thanks to the internet and software advancements. And, today many economists use the concept of "the platform economy" as a way to characterize the enormous reach and ubiquitous uses of Microsoft, Google, and Amazon websites for the conduct of more and more business nationally and globally. Each shift has given rise to increasingly global networks. Each has organized innovation, production, marketing, distribution, and business services in different ways. Each shift has given rise to new

industrial clusters and relationships requiring new knowledge and competencies in the workforce. The pace of change, especially the accelerated rise and decline of key industries has brought with it new workplace expectations and skill requirements which in turn require continuous education and reskilling for large numbers of people and a need for scale. What we have today is a globally distributed system of invention, production and distribution and the rapid decline of monolithic, vertically integrated companies across all sectors. These globally distributed enterprises have profound implications for the American workforce and the challenges in the global competition for talent. US citizens previously competed for jobs within their town, neighboring counties, or neighboring states. But today, talent pools in Taiwan, Sweden, and Brazil are also competitors. A company may have its headquarters in St. Louis or Stockholm or Sao Paulo, but it still could have 60% to 80% of its activities and workforce located in dispersed regions around the globe.

The implications for education and training shaped by the competitive issues facing the US talent pool are radically different today than in previous eras. High demand competencies and expertise required across multiple industries can now be sourced not just locally or nationally but globally. Nonetheless, our K-12 and higher education systems, so suited to earlier economic regimes, are lagging in their capacity to produce the quality of citizens and workers this great nation now requires.

Technology

Rapid changes in technology which affect not only the content and character of the products being produced but the ways in which they are being produced compounds the education and training challenges needed to be addressed by higher education. In a mere 25 years, such things as the development of the internet, cell phones, high speed computing, and AI have transformed financial markets, fueled the growth of telemedicine and created on-line retail platforms squeezing out not just small business but “big box” stores. The economies of the world are increasingly built on digital platforms transforming everything from retail, news media, manufacturing, healthcare and education. All have changed the way people work and what they need to know in profound ways. And in addition, the rapidity with which the digital technologies are put to work in the economy means that the workforce must be ever conscious of new requirements that are being driven by ever increasing shifts in the tools and processes used to get things done.

Examples of how technological innovations can replace hundreds of thousands of existing jobs, simultaneous with creating hundreds of thousands of new jobs requiring new skills and competencies abound. Calculators and typewriters, core tools of the 1960s and 1970s are

replaced by laptops in the 80s and 90s and cell phones today. Bank tellers, real estate brokers, car dealers, retail malls and movie theaters are all in decline as online banking, shopping and entertainment gain market share. And, healthcare is being transformed, not just by telemedicine, but by the myriad online health sites consumers can refer to resulting in a move to personalized medicine which the well-known, Eric Topol, MD, elucidates in his book, “The Patient Will See You Now.”

Demographics

The final piece in this contextual puzzle is the way in which demographics/population characteristics are reshaping talent pools and the workforce challenges and opportunities in the 21st-century economy. Advances in communications and transportation have created a population mix in vivid contrast to the post-World War II era when the United States in particular, benefited from waves of talented immigrants from a hollowed out Europe coming to the United States to study at our universities and participate in the booming growth of the US economy. Today, not only Europe but Asia have rebuilt their social and economic foundations. And, in many ways, they have outpaced the creativity and productivity of the United States. Talent now is attracted to multiple centers of creativity and growth across the globe. As a consequence, the population mix of the United States has changed dramatically posing new opportunities and challenges given 21st-century economic realities. The age distribution and percentages of ethnic and racial groups in the United States are far more mixed than ever in our history. Large waves of new immigrants from Asia and Latin America, multigenerational pockets of poverty and our daunting history of racism underscore the urgency with which education and training institutions need to respond to population diversity in ways that assure rapid access to higher learning and critical competencies for employment.

The paradox is that while the organizational forms and dynamics of work and production have changed radically, the organizational dynamics and cultural values prevailing in higher education are still based on an industrial model of learning framed by an intrinsically exclusionary, Eurocentric idea of education as a full-time, residential experience for young adults primarily focused on liberal learning. Embedded in this vision is a blindness to the extent to which secure family roots and unacknowledged forms of social capital have significantly advantaged some groups over others. These, as importantly, also play a role in enabling select groups of young college graduates to find meaningful work and build productive lives in spite of an absence of attention to workplace readiness during their college years.

A society and an economy dependent on a much larger talent pool drawn from many diverse social and ethnic communities benefitting from different forms of social capital requires

higher education institutions to broaden their definitions of a) what it means to be an "educated person," b) how to pace educational careers, as well as c) what kinds of education, training and experiential learning most effectively prepare people for life in a complex, increasingly integrated global society. This means not just doing things in the *same way* for larger and larger numbers of students but finding ways to scale access to higher education and workforce credentialing in multiple ways which effectively can educate diverse learners.

Conclusion

The Lumina Foundation, referenced in the introduction to this chapter, has embarked on a major effort under the rubric of A Stronger Nation. They are tracking America's progress towards a more robust, inclusive talent pool by 2025. Based on growing research findings they project that by 2025, 60% of Americans will need to hold a credential beyond high school, a quality credential that prepares them for informed citizenship and economic success. Today only about 52% of the American population has some form of credentialing beyond high school. Thus, there is a large gap to be filled in a very short time. It is also important to note that states vary on measures of current competency with some states having only 42% of the population and others 58% of the population currently credentialed. The Lumina Foundation is calling for a comprehensive system for learning beyond high school; one that is built on the expectation that every American will earn a credential. They also recognize that single credentials are likely to be insufficient over time because there will be a continuous demand for upskilling, reskilling, and cross training over the lifespan due to the rapid changes previously discussed. Gary Matkin, Dean of the University of California at Irvine (UCI) Continuing Education, recently published a piece on this topic (Matkin, 2019). He points out that there are imperatives that require universities to consider how over time they relate to the specialized education that will be required over the multiple decades of a person's work life. UCI, like all campuses of the University of California, provides hundreds of certificate programs primarily for postbaccalaureate adults working in engineering, teaching, nursing, medicine, law, project management, R&D, etc. Lumina is also documenting how more and more degree programs are offering curricula and experiences that enhance work readiness among college grads. At UCI they have identified degree courses which articulate with their professional certificates as well as have currency in the world of work. An undergraduate course in mammalian laboratory techniques prepares students in 17 measurable competencies that are relevant to working in research laboratories or life science companies. UCI awards students a "badge" of competency that they can carry with them into the world of work along with their bachelor's degree. In another UCI course, a professor teaches students how to create something of use/value with 3-

D manufacturing so they understand how to move from the "virtual" world to the world of "reality." A successfully executed 3-D printed object merits a UCI "badge" which these engineering students can carry with them. Matkin's point is that alternative credentials such as these can be embedded in the traditional curriculum but also can be made available in self-contained certificates and credentials. They certify competency to employers and many are potentially scalable. Universities need to embrace these additional forms of credentialing both within the existing curriculum and across the lifespan through easily accessible certificates and advanced degrees to assure the talent pool required for both citizenship and work. The case studies at MIT and Georgia Tech included in this volume are excellent documentation of how this can be done.

In sum, the demand for talent is indisputable. That demand involves ever increasing levels of competency among larger and larger groups of people in the fundamentals as well as in the knowledge and competencies needed for employment, reskilling, upskilling, and cross training over the lifespans of professional and technical workers. Thus, the stakeholders in the university enterprise are diversifying and growing by leaps and bounds. In order to meet their needs, universities need first to embrace the idea that different forms of educational certification are necessary and appropriate across the various ages and stages of a person's life. They then need to acknowledge that in the 21st century they have a vital role to play in assuring educational access and credentialing across the lifespan because of the growing significance of advanced and technical knowledge in all fields of practice. Clearly foundational knowledge is essential to all forms of learning. However, the ability to operationalize concepts and ideas into solutions, programs and products which directly benefit the society and the economy require different types of knowledge and different ways of organizing and delivering that knowledge so that it can be absorbed quickly and put to work immediately.

These forces combined have given rise to a number of interesting and significant initiatives in universities across the globe which, until recently, existed on the margins of mainstream universities and colleges, and in particular, research universities. A number of innovative initiatives suggesting how change is beginning to happen in higher education are included in this volume. The book is organized around four major themes. The first is vertical at scale with articles on how MOOC programs at the University of Illinois at Urbana-Champaign and emerging remote classes at Georgia Institute of Technology have worked. Section II on strategy and change management shares the experience of Georgetown University in scaling teaching infrastructure rooted in Jesuit values addressing quality online learning at scale at the University of California Davis and institutionalizing scalable learning provisions at Louisiana

Tech University. Section III addresses the importance of fostering a culture of innovation with very useful insight from the University of Maryland System, Georgia Tech and a useful example from the Delft University of Technology in the Netherlands. Section IV addresses issues of scaling new online capabilities with excellent insight from the University of Washington, from Trinity College of Engineering in India and from the experience of edX. Our book concludes with a thoughtful epilogue from Yakut Gazi, Nelson Baker, and Karen Sibley addressing, not only scalability, but affordability in a post COVID-19 world.

The order of magnitude these new educational imperatives represent means that colleges and universities across the spectrum, but most especially research universities because of the ways they contribute to innovation and the growth of new industries, *must* find ways to 1) enhance access, 2) assure affordability, and 3) scale their reach. The very interesting case studies in this volume provide important clues and even models as to how that can be achieved. It is time to take action across America's higher education system. The demonstrated successes included in this collection suggest that America's higher education system is more ready than most believe to meet the challenge of providing accessible, high-quality, scalable education for ALL.

References

Atkinson, R. D., Muro, M, & Whiton, J. (2019). *The case for growth centers: How to spread tech innovation across America.* Brookings Institute.

Lumina Foundation (2020). *A Stronger Nation: Learning beyond high school builds American talent.* Retrieved from https://www.luminafoundation.org/stronger-nation/report/2020/#nation

Matkin, G. (2019). A practical guide to issuing badges at your institution*. The EvoLLLution*. Retrieved February 19, 2021 from https://evolllution.com/programming/credentials/a-practical-guide-to-issuing-badges-at-your-institution

Osterman, P., & Weaver, A. (2016). *Community colleges and employers: How can we understand their connection? Industrial Relations Journal*, *55*(4), 523-545.

Topol, E. J. (2015). *The patient will see you now: The future of medicine is in your hands*. New York: Basic Books.

SECTION I

Vertical at-Scale in the Service of Horizontal at-Scale

Horizontal Scaling: How Experience in MOOC Programs Helped a College Strategy in Emergency Response

Norma Scagnoli[a] and Martin Maurer[b]

Abstract

This chapter shares an evaluation of the response to the "emergency remote teaching" situation in March of 2020 due to the outbreak of the COVID-19 pandemic. The authors focus on how capacity building in eLearning rendered positive results internally and allowed for the quick and successful horizontal scaling at the Gies College of Business at the University of Illinois at Urbana-Champaign. They placed specific emphasis on strategies and tactics implemented by the Gies eLearning team to expand their services to all college faculty and students in making a rapid transition to online teaching. A post-implementation analysis explains the implications to this transition on the organization and changes of practices and policies related to scaling online best practices to residential courses and programs.

Keywords: At scale, emergency response, emergency remote teaching, ERT, horizontal scaling

Introduction

The rapid spread of COVID-19 during the spring of 2020 and the sudden end to face-to-face instruction at U.S. campuses has forced many higher education institutions to transition to remote teaching and learning virtually overnight. The Gies College of Business at the University of Illinois at Urbana-Champaign was no exception. However, because Gies had initially invested in eLearning staffing and infrastructure, the college was well positioned to face the challenge compared to schools and colleges which had no internal online learning services and had outsourced their online initiatives to Online Program Management providers (OPM).

The AACSB accredited Gies College of Business currently serves nearly 7,000 students. It hosts over 3,000 students in undergraduate programs and close to 4,000 students in various specialized master's and Ph.D. programs. The iMBA, a fully online MBA program, makes up the lion share of the College's graduate students. It was launched in 2015 in partnership with Coursera and has grown to over 3,200 students to date. It was recently dubbed the "fastest-growing MBA on the planet" by Poets and Quants. Since 2017 the College also offers a fully online MS in Accounting program (iMSA), which has become one of the largest accounting

[a] Northeastern University, n.scagnoli@notheastern.edu, ORCID: 0000-0003-4358-0191
[b] University of Illinois at Urbana-Champaign, maurer1@illinois.edu, ORCID: 0000-0002-0672-7177

master's programs in the country, and in the fall of 2020, Gies added a third online master's program to its portfolio – an MS in Management (iMSM). In addition to the online degree programs, the Gies College of Business also offers a fully online business minor that is open to all students at the Champaign-Urbana campus, and many of its other courses are offered in a blended and flipped format. The Gies eLearning Office played an integral role in the successful launch and scaling of Gies' online programs and the recent horizontal scale needed to develop and support the "move to online" that all residential courses experienced in mid-March of 2020. The office was established in 2006 and consisted only of two full-time staff members. To support the rapid expansion of the Gies online programs, the eLearning Team has grown rapidly over the past years. Today it consists of a large team of over 30 full-time and 20 part-time highly skilled instructional designers, digital media specialists, videographers, and project managers, who partner with faculty to produce high-quality and state-of-the-art online and blended courses. Additionally, the office employs several student workers trained in course support, course production, and contributing to assisting the office's research and evaluation efforts in their constant improvement approach to course design and teaching in business education.

When "At Scale" Became the New Normal

From the perspective of a unit with an infrastructure set up to serve 3000+ learners in the online space, and which has done it successfully every day over the last three years, the response to the "emergency remote teaching (ERT)" (Hodges, Moore, Lockee, Trust, & Bond, 2020) seemed simple. It was about replicating the success of online at scale, hence, it was attainable because of the infrastructure and know-how. The know-how was influential and useful, and reflecting on our experience, we realized that moving away from the traditional online in our at-scale experience, we could provide a fresh perspective and successful response to a residential set-up in an emergency call that needed a quick turnaround.

Framework

To evaluate our horizontal scaling efforts, we used the CIPP evaluation model (Stufflebeam & Zhang, 2017), and we analyzed the context, input, processes and products, guided by these questions:

1. How much of our existing resources were necessary to support this transition? What aspects of the institutional context affected the feasibility and effectiveness of the transition? (context)
2. To what extent was our technology infrastructure sufficient to handle the needs of ERT? (input)
3. How did we adapt our processes to respond to such operational challenges? (process)

4. How did feedback from learners, faculty, and support teams inform the results of horizontal scaling, and how could it be used as response to needs in the future? (product)

First, we analyzed how much of our existing resources were necessary to support this transition, and what aspects of the institutional context affected the feasibility and effectiveness of the transition. As shown in Table 1 and Figure 1 below, the equivalent of one instructional designer's time was moved from the full support of online programs to support ERT; one staff time from digital media and one from the learner experience team were also moved to support ERT. Additionally, college staff from public-facing units volunteered or were reallocated to our eLearning unit, so they received training to support students' requests (see Figure 2 for additional tasks assigned).

A quick response by college administrators to eLearning requesting volunteers from units that had staff members with extra capacity was key to achieving effective support. The dean, department heads and directors of different units within the college, including the director of IT, enlisted personnel that were willing or available to get trained and become skilled in managing and triaging online support requests from residential students that were moved online. Their interest in contributing to improving the situation by providing some help was the aspect of the institutional context that affected the feasibility and effectiveness of the transition. About thirty members of the college staff volunteered and were trained to participate in the online support shifts that were going to be launched the first week of classes after Spring Break (mid-March 2020). The staff members were assigned in groups to an eLearning staff mentor who would meet with them once a week for training. In the next six weeks from Spring Break to the end of the semester, student support used staff volunteers and eLearning staff to support students during the weeks that led to the end of the spring term. These staff members were not familiar with online support. The training of the staff focused on the identification, and recognition of the nature of online requests and triage them to experienced personnel with expertise in troubleshooting. Data from the request were collected and used for training and for data collection purposes. The eLearning staff supporting the groups used the data to build information sites based on the frequently asked questions by students in the spring and then in the summer semester.

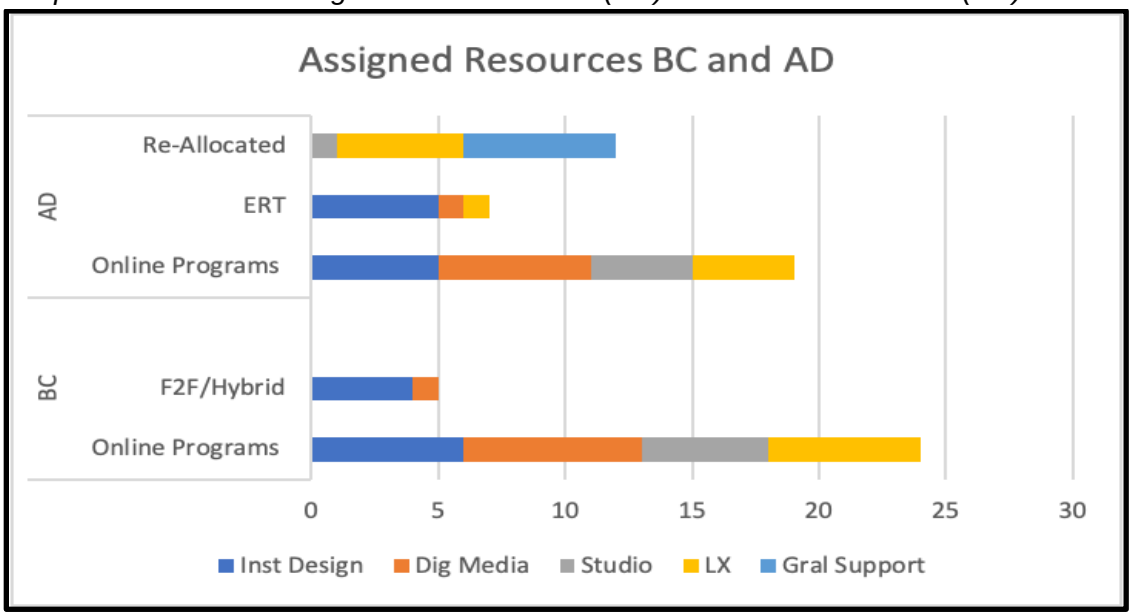
Table 1

Detail of Allocation of Resources Before and After the Emergency Remote Teaching.

	Before Covid-19			After Disease (ERT)		
Roles	Total Staff	Online Programs	F2F/Hybrid	Online Programs	ERT	Re-Allocated
Inst Design	10	6	4	5	5	0
Dig Media	8	7	1	6	1	0
Studio	5	5	0	4	0	1
LX	6	6	0	4	1	5
Gral Support	0	0	0	0	0	6

Figure 1

Graph of Resources Assigned Pre-COVID-19 (PC) and After the Disease (AD).



Emergency Response and Tactics

The rapid response to the transition to remote instruction required leadership, skilled personnel, expertise, and infrastructure.

Leadership: Pilot, Communication, Training, Implementation

Similar to what happens in other situations of crises (UNESCO, IIEP, 2011), creative ideas and interest in problem-solving arose among staff members in the eLearning Office, who immediately assumed leadership of contingency planning processes and communication.

Multiple ideas were discussed, and in a short time, a committee of crisis arose among the eLearning staff community. The experience of the personnel working at scale was evident, and their response to making the horizontal scaling possible was key to this initiative's success. Personnel that was familiar with providing support to massive online courses took the lead to create venues that would enable online synchronous and asynchronous training for teaching or taking classes online. Preparation started in early March with a plan to experiment with remote instruction the week right after Spring Break.

Table 2

Timeline Proposed for Remote Teaching Response

Wk 1 (Orgnztn)	Week 2 (Comm)	Wk 3 (SpringBreak)	Week 4 (Pilot)
Preparation	Town Hall	Training	Pilot / Implement

Contingency planning for residential classes to be moved online at Gies started in early March of 2020. On March 10, the College's Dean held a Town Hall during which he prepared faculty for the most likely of scenarios as a result of the COVID-19 outbreak. By March 9, the eLearning Team had already put in place a detailed support plan for faculty and students and started preparing its staff members for what will most likely go down as one of the busiest weeks of their lives – the week of March 16 – which also happened to be the week of Spring Break. Under normal circumstances, this is a time when many employees and faculty enjoy some time off. Instead, the week became an all-hands-on deck approach that pushed each member of the eLearning staff to their limits.

Skilled Personnel with Expertise, and Infrastructure

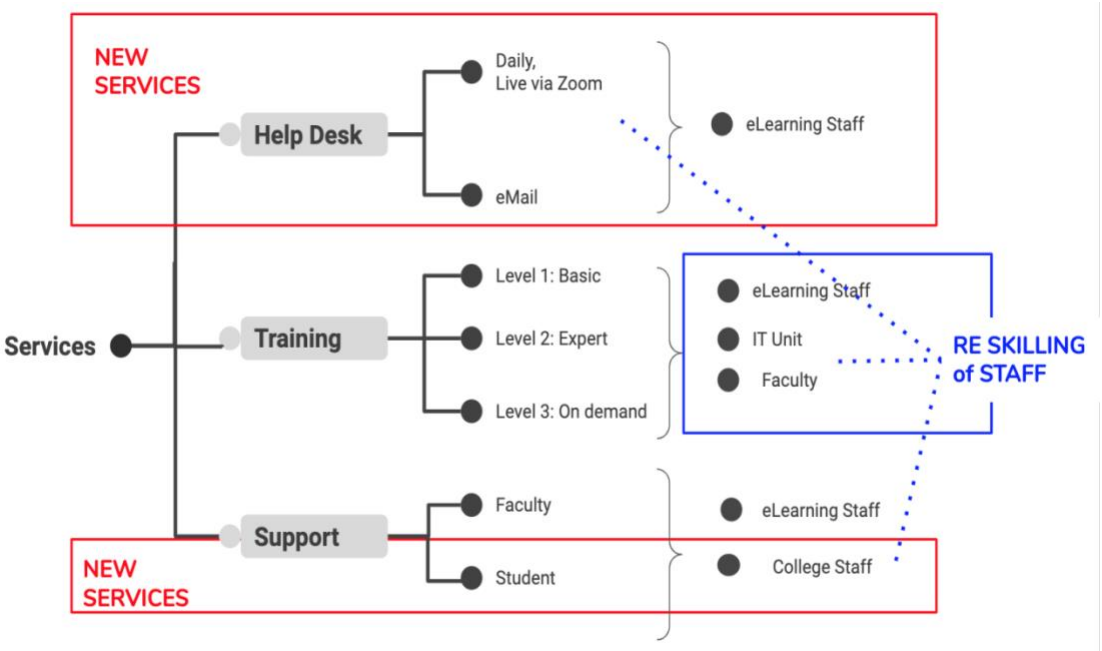
A decision made five years pre-COVID-19 marked the college readiness to respond to this emergency. To support the rapid expansion of the Gies online programs, the college administration had to make a decision that many colleges face when they are on the verge of growing their online presence: building capacity in house or outsourcing. Gies leadership, after careful assessment of the pros and cons of the two options, decided that having in-house expertise and technology infrastructure would make the response to current and future online initiatives more sustainable. Therefore, creating and supporting a team that would design, develop, and implement online courses was an investment that would match their strategic development. So, the decision was to focus on the capacity development of the existing eLearning Team. In March 2020, the college had skilled personnel to help develop the support infrastructure required for training and implementation of remote teaching starting at the end of

March. A strong infrastructure will provide the sustainability and support that a college needs to maintain the level of quality service in current offerings when a new area of the college requires additional support (Woods, 2020).

During week four, the eLearning office began extending its services that it normally provides to online programs and hybrid and online courses to all residential programs and courses. The services focused on three areas of need: Online Help Desk, Faculty and Student Training, and Support for teaching and distribution of information. The three instances were managed by eLearning personnel with expertise in online learning and online support and staffed with personnel from student services and eLearning. Figure 1 and the paragraphs below illustrate this extended service model.

Figure 2

New Services and Reskilling of Staff Designed to Respond to Remote Teaching Strategy



The Online Help Desk was open 9 to 5 every day via Zoom to respond to instructors' questions. The Help Desk was staffed by members of the eLearning Team.

1. Faculty and student training were provided in three ways:

    a. Level 1: Basic Live (Zoom) Training Sessions on topics of interest for faculty who had never taught online and needed to learn the basics to carry on with their teaching. The eLearning office is equipped with trainers and resources for

training faculty. The novelty was that all training had to be conducted online, but we leveraged existing eLearning training materials and staff.

b. Level 2: Expert Seminars via online training sessions that focused on specific topics and were hosted by experts on those topics, such as faculty with extensive experience teaching online

c. Level 3: On-demand video tutorials via the eLearning training website for faculty and students and asynchronous communication through emails, forums, and mailing lists.

2. Continuing Support consisted of assistance to faculty and students in their online classes and also in overall support in the diffusion of information via webinars, or Zoom sessions, which were done in collaboration with IT partners and our Marketing and Communications team.

    a. Faculty support. Supporting faculty in online environments is a service that eLearning provides as part of its ongoing offerings. While this service and training faculty were not new for the eLearning unit, it required expansion to a much broader audience. Online help desk and email communication were used for just-in-time and on-demand support.

    b. Student support, on the other hand, was more challenging because the eLearning office was not equipped with the staff needed to serve twice the number of students. The strategy to respond to this challenge was to train existing college staff who had reduced hours because they served the residential students on site. When the college closed, some of their responsibilities were put on hold, allowing the eLearning Office to train and develop staff from other college units to help triage student requests for support. eLearning managed the organization, supervision, and mentoring of the new staff for the six weeks that followed the college lockdown.

Analyzing the extent to which our technology infrastructure was sufficient to handle ERT's needs, we concluded that we met those needs and exceeded the expected outcomes. Moreover, our experience helped us set up a system that served us in the upcoming summer semester and was improved and re-implemented in the fall. It will probably continue in spring and in the future with or without a crisis. We had managed to scale our infrastructure

horizontally, which taught us an essential lesson of better implementation for online and residential users, and the systems will persist "after disease."

Emergency Response Strategies

Following our CIPP evaluation framework, we examined how our processes had to be adapted to respond to new operational challenges at the time of analyzing our processes. Strategically, we determined four areas of importance for the deployment of the services. They included repurposing quality materials for a speedy response; prioritization of resources, identifying talent to train and expanding services; and monitoring deployed services to confirm results.

Quality and Speed of the Response and Deployment of Resources

By repurposing existing resources and infrastructure, quick adaptation and deployment of resources appropriately adapted to the new needs. In the early stages of the process, the value of existing infrastructure and in-house expertise at scale to provide an immediate response to the emergency was evident.

Prioritization in the Deployment of Resources

Use of Experts. To organize and deploy resources in a timely way, the eLearning team experts provided data on the use of resources and FAQs from similar times of the semester in previous years. The type of resources and training needed was determined by the activities that are commonly completed in class after Spring Break, that is six weeks before the end of the semester. Drawing from a database with questions, support and training information, a new training site and a suite of training materials was prepared.

Topic Priorities. The topics were prioritized by seasonal needs and by faculty training needs. By seasonal needs we mean activities that commonly happen at this time of the year. For example, after Spring Break, students usually start working on final group projects or exam assignments. Most faculty did not know how to teach using synchronous tools to monitor and track assignments submitted online. So, the first training sessions focused on faculty and students' presentations in Zoom, student interaction with teams, engaging the class in live sessions, and tracking and grading online assignments.

Synchronous vs. Asynchronous Help. The daily help desk received between 8-15 daily visits by faculty members. To use resources efficiently, the office manager and office assistant served as "receptionists" in the Zoom help desk. After greeting the faculty member and identifying the issue, they would use Slack to call a team member with expertise in the specific questions, and they would be placed in a breakout room so faculty did not have to wait, they

would be sent to breakout rooms based on the topic of consultation. This system allowed for on-demand use of resources.

Online live seminars on the basics and advanced topics to teach online were deployed weekly and recorded. These seminars had been traditionally offered once a month in regular semesters, with an attendance of 5-8 faculty members per session. Now the Zoom-based seminars had an attendance of 20-30 participants every week.

We recorded all online seminars and the interactions with faculty in the daily help desk were recorded and we added the most representative or relevant topics to a video channel called “eLearning Tutorials”. The contents of a blog following the recommendations of the type of resources and training needed was determined by the activities that are commonly completed in class after Spring Break.

Identification of Talent to Train and Expand Services

A new strategy was implemented in order to be able to comply with the services proposed without increasing the number of staff members in the eLearning office. The talent was recruited and trained in three fronts, and the volunteers received some “reskilling” training to help under the support and guidance of eLearning experienced staff. As shown in Figure 1, the incorporation of staff followed three groups:

Non eLearning Staff. The eLearning office requested from the college the reassignment of public facing staff who saw their hours reduced because of the campus offices closing. These were not affiliated with the eLearning office, but they had expertise working with students, most of the staff trained were from student affairs or student support offices. They were trained to work with the eLearning ticketing system and help triage requests for help from students.

Re-assignment of elearning Staff. Staff reassignment occurred, for example, by training the office managers to use Zoom to serve as the first point of contact in the daily Help Desk.

Faculty Mentors. Volunteer faculty helped in on-demand requests, seminars, and as point of contact for faculty who wanted to reach out to them for examples or further pedagogical strategies discussion. We invited them via email to join eLearning staff in the Help Desk, they would teach short sessions on key topics. The names of faculty volunteers were listed in the training blog.

Monitoring of Deployed Services to Confirm Results

We defined the reference points for data analytics that would help us monitor the ongoing remote teaching support. The tickets received from faculty and students were two of

those data points. We added three additional data points: faculty interviews; reskilled staff surveys; and students' end of course surveys. The information we collected helped us in the planning and creation of the Summer Teaching Academy and summer student support. Horizontal scaling of our services could not have been possible or successful without looking into the tracking and ongoing evaluation of results.

Implications for eLearning and the College

Lessons Learned

Finally, we assessed how feedback from learners, faculty, and support teams informed the results of horizontal scaling and how it could respond to future needs. Thanks to the feedback collected in surveys, analysis of tickets, interviews with faculty, conversations with administrators, and internal community discussions, the experience assisting large enrollment courses in our MOOC based degrees was critical in the rapid and effective planning and implementation of support in this crisis. The process of horizontal scaling left several lessons learned from our perspective:

The investment *in capacity building* showed its value in this emergency response. We had not considered emergencies when assessing the ROI for developing in-house capabilities to build our online initiatives. By having the infrastructure and resources available, we could respond quickly and effectively, using untapped college resources, reskilling staff, and creating collaboration channels where there were none before.

The *generations of learners* born in the XXI century, such as our undergraduate students in 2020, have more familiarity and confidence in using learning technologies that become evident in the ways they solve common technology issues in their courses. We saw that *self-support* is very common. Students reported that they troubleshoot themselves before asking for help, then asking their networks, and, finally, using the school provided resources when they have exhausted their channels.

Building a *knowledge base with information* that can help feed commonly asked questions, and recommendations should start as soon as possible in normal life in crises. When data is collected and cataloged right, the opportunities for artificial intelligence (AI) systems to help are enormous.

Use as many varieties of *formats to provide help* as possible. If you are recording a video, you need to be aware of text to speech capabilities, so the video becomes text, and the audio becomes sound files that can be enhanced, adapted and deployed separately. Appealing to users' preferences, even when everything is going to be online, makes a difference in users' satisfaction and comfort accessing your training or support materials.

It is important to *maintain focus* and be reminded of the mission of the unit. In spite of the response to the COVID-19 crises, our team did not lose focus on our key strategic objectives of expanding our portfolio of online degree programs and non-credit online offerings. During a crisis response, it is easy to lose sight of strategic priorities that were in place prior to the crises, but we helped launch new courses and a new online degree program in the midst of the crises.

Never underestimate the power of crisis to bring people together and show where the leaders are. From the staff perspective, we learned that the staff in each department, including our own eLearning staff, found this *challenge very rewarding* in the sense that they had the opportunity to interact with and meet new people from the same college with whom they would not have interacted with before; and because they also had the opportunity to show leadership in new areas, where they had expertise, but it was unused before. For example, staff provided support to graduate students, helped design a new structure for undergraduate student support. And because this infrastructure ended up being more modern and proved to be successful, it was later adopted by those who helped create it.

What If…?

We have often wondered what if we did not have the online learning expertise in house, how would we have handled the change? In conversations with colleagues of several institutions, in meetings with our Educause and AACSB counterparts, we learned that those schools that did not have the resources in house followed one of these options:

- They used campus resources, and this seems to be the most common alternative. Those universities that have existing campus resources had the opportunity to highlight their services and expand their customer base, learning more about all units' needs, even those that would not have normally used services for online learning. This shift to remote teaching showed faculty that they have to take more control of their own course design, development, and implementation process. Many faculty in need of support and development demonstrate that colleges and campuses have to consider building capacity for development and support teams that will meet the institutional need to provide instructional continuity.
- As Hodges et. al. (2020) say, “institutions must rethink the way instructional support units do their work” and they should use the lessons of this crisis to make decisions today for the next five to ten years. Being complacent with your achievements at the end of the spring semester of 2020 should not be evidence that the educational community knows how to come together and respond in a crisis. All academic

institutions and the members of the academic communities worldwide should be taking responsibility to make sure that everybody plays a role in the instructional continuity in the future.

- Faculty helped other faculty, and they created communities where they mentored each other. The interactions with colleagues at a time of crisis has built networks that faculty members will grow to appreciate and probably maintain. The new nature of interaction when mentoring happens online and in virtual communication channels creates the possibility of lasting relationships that may continue even when faculty members may move to different university campuses in the world. Zellers, Howard, and Barcic (2008) make a point that has been seen in this ERT situation, when "dynamic organizational change, increased specialization and innovation, and the acceleration of technological advances prescribe a new mentoring paradigm in which mentoring relationships are pluralistic and reciprocal" (p.563).
- Schools extended their contracts with their OPMs or others servicing online learning to support the needs of instructional continuity for their residential courses. This move may not be sustainable over time. Schools that used OPMs wanted to get experts' help to be ready to go online soon, and they could move some of the risks to the OPM provider in exchange for a share of the tuition revenue (Zipper, 2016). However, in ERT times, they have to share the revenue of the tuition of previously agreed online courses, but they have to share 100% of all course revenues if schools have all their classes remotely.

From the New Normal to the Future

Having been forced to expand our services from a vertical scale to a horizontal scale and use our resources and infrastructure to assist the whole college in a short time has made us realize that colleges will need ongoing support of units dedicated to educational innovation and faculty development. Our eLearning unit was ready to help but, we were not prepared to work with those who were required, hence not ready or interested in teaching online. The usual drill of showing the possibilities and opportunities of learning technologies to enhance and enrich the teaching in a discipline was no longer an appealing message for the emergency remote teachers. We realized then the need for groups that focus on educational innovations that can help faculty members at all times.

We value the importance of having a "teaching and learning" group that serves each and every college or university. Not just an "eLearning" group, but a unit that will provide leadership in the area of teaching and learning innovations for a particular discipline seems to be the next thing to consider by higher education administrators. The world has become more

professionalized, and academic institutions have stayed as is for many years, without considering what is needed “to get their job done” as expected by the society where they are immersed. Colleges expect that instructors will keep up with their research, teaching, and service and apply innovative teaching strategies in their discipline, when they mostly attend conferences that do not focus on the teaching of the discipline but on their area of research. New teaching strategies become shared word-of-mouth or in a campus conference that is not well attended.

What would it take to start funding an office of teaching and learning in every college or campus? Very few colleges have ‘teaching and learning’ centers that help the faculty members in the discipline be up to date in learning innovations specific to their area of expertise. Sometimes IT staff are used to help with setting up online classes, but they usually lack the pedagogy skills needed for developing high-quality online courses. Or a willing faculty member or staff member becomes the guru of setting up a teaching strategy for a college, disregarding that the advances in technology and practices make it almost impossible for a part-time or volunteer member to keep up with changes in all areas all the time.

The response to COVID-19 has demonstrated the need to keep up with trends and advances in teaching and learning at the college or unit level. One size does not fit all anymore in teaching and learning, and we have seen that having the expertise in-house has helped move from a vertical and very specific type of service to scale horizontally and serve the whole college.

Conclusion

Capacity building in eLearning was key for the quick and successful horizontal scaling that helped colleges and universities at the outbreak of COVID-19 pandemic in March of 2020. The infrastructure built to support eLearning initiatives proved to be critical to support the response to the crisis. However, the knowledge and experience assisting learners at scale, as in massive open online courses, made a big difference. Our existing resources and processes in place to respond quickly and to large groups helped enormously to support this transition. Not only was our technology infrastructure sufficient to handle the needs of ERT, but the crisis also sparked innovation, and we certainly learned new possibilities for implementation that will change some of the processes we had PC (pre-COVID-19). Forced to interact with other internal groups such as the IT unit and the residential programs support teams, together, we came up with new ways to deploy some of our services. Including managing help desks, collecting information from new ticketing systems, and responding to emergency online requests from a population not ready to take online classes. We adapted our processes and set up new

processes based on newly defined priorities. We did all this getting together in multiple meetings as a group, we discussed, proposed, analyzed and set up new rules, new processes and new priorities. The common goal of instructional continuity kept us focused and creative. The feedback from learners, faculty, and our own support teams showed us that what we had learned in the process of scaling our services had been crucial to enable this horizontal scaling that will probably render processes that will continue to be used in the near future and long term.

Overall, we have learned that colleges and organizations need to sustain and keep training the muscle of educational innovation in their disciplines internally. Hiring good instructors and excellent researchers will not be enough to respond to new educational needs and be ready to keep teaching in crisis times. The exploration and examination of best practices, the readiness to adapt, and the flexibility to respond and meet all constituents' needs have to be an integral part of the mission and vision of colleges and institutions. The so-called *instructional continuity* is the job that society expects an educational institution to fulfill, so investing in the creation and development of resources that will support innovation in teaching and learning internally, is a must. Organizations have to rethink decisions about the physical infrastructure, the new use of physical spaces, the ways in which each institution will address possibilities for hybrid learning, the openness to new ways of teaching, and the new normal for academic and administrative interactions. Those institutions that started at scale are today in a better place to respond. Where is your institution?

References

Davies, L., & Bentrovato, D. (2011). Understanding education's role in fragility: Synthesis of four situational analyses of education and fragility: Afghanistan, Bosnia and Herzegovina, Cambodia, Liberia. *International Institute for Educational Planning. UNESCO*. Retrieved August 19, 2020, from https://unesdoc.unesco.org/ark:/48223/pf0000191504

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). *The difference between emergency remote teaching and online learning*. Retrieved July 18, 2020, from https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning

Stufflebeam, D. L., & Zhang, G. (2017). *The CIPP evaluation model: How to evaluate for improvement and accountability*. New York, NY: The Guilford Press.

Woods, J. (2020). *A strong online learning infrastructure is key to higher ed's future*. Retrieved September 1, 2020, from https://www.ecampusnews.com/2020/09/07/a-strong-online-learning-infrastructure-is-key-to-higher-eds-future/?all

Zellers, D. F., Howard, V. M., & Barcic, M. A. (2008). Faculty mentoring programs: Reenvisioning rather than reinventing the wheel. *Review of Educational Research, 78*(3), 552-588. doi:https://doi.org/10.3102/0034654308320966

Zipper, T. (2016). *The value of the online program management industry*. Retrieved September 1, 2020, from http://www.uncompromisingedu.com/2016/06/23/the-value-of-the-online-program-management-industry/

Mechanisms for Supporting Emergency Remote Classes: Towards a Distributed Classroom

David A. Joyner

Abstract

During the rapid emergency transition to remote classes in 2020, our online Master of Science in Computer Science program supported the newly remote traditional classes in several ways. In this chapter, we go over some of those ways, including providing direct feedback, opening up remote instructional resources, reassigning classes to remote instructors, and providing material for the formation of local cohorts. We then investigate how these mechanisms are small steps toward a broader, more fundamental reimagining of classrooms as distributed across time and space.

Keywords: Online learning, distance learning, distributed classroom, COVID-19

Introduction

Georgia Tech is home to the online Master of Science in Computer Science (OMSCS) program, an entirely asynchronous and remote graduate program that grants the same degree as the on-campus program. As of Fall 2020, the program enrolls over 10,000 active students, and it has graduated over 3,000 students in the 6 years since its inception. For more information on the program itself, we recommend reading Goel and Joyner, 2016; Joyner, 2017; Joyner, 2018a; Joyner and Isbell, 2019, and Joyner, Isbell, Starner and Goel, 2019. For the purposes of this chapter, it is sufficient to know: the program employs approximately 300 teaching assistants, the majority of which are remote; most courses in the program are also offered on campus, typically by the same professor; and the online program shares much of the same infrastructure as the on-campus program, including the same learning management system and the same policies and governance. Overall, the online program runs very similarly to the on-campus program, but at scale and without synchronous co-located class sessions. Instead, students and instructors interact via the learning management system and accompanying course forum, in the form of assignment feedback, Q&A, and class discussions. We have interestingly observed that the quantity and range of instructor-student interaction is higher in this medium than in-person (Joyner, Goel & Isbell 2016).

Georgia Institute of Technology, david.joyner@gatech.edu, ORCID: 0000-0003-0537-6229

In the wake of COVID-19 in Spring 2020, our initial concern in the OMSCS program was, as with everyone else, the immediate impact of the pandemic on our operations. As the days turned to weeks, it became clear that the impact on an already-online program was relatively minimal. Not only were our students already attending remotely and asynchronously, but 2/3rds of our teaching assistants are members of the online student body as well. While these students and teaching assistants were still impacted by COVID-19 in their own family and work lives, their work in our program was largely unaffected. In some instances, it was actually accommodated: our first awareness of the pandemic came in mid-January 2020, when a student in Wuhan wrote to express that quarantine was giving him more time to focus on his OMSCS work. Aside from giving a record number of Incomplete grades (a placeholder grade assigned when, for health or family reasons, a student is unable to complete a course on time), our workflows were largely unimpacted—and even those Incompletes were relatively manageable due to the pre-recorded course content and ongoing TA availability.

Thus, our attention quickly shifted to how we might support the on-campus program as it went through a much more dramatic upheaval. In many ways, the on-campus program was tasked with quickly learning to do what we in the online program do every day; however, it was also tasked with creating in two weeks what we usually spend several months developing. In this chapter, we present four of the ways in which the online program supported the in-person program from Spring 2020 through Fall 2020. We then reflect on how these sorts of developments dovetail with broader trends in remote and online education, moving towards a notion of a “distributed classroom” that is less sensitive to the constraints of time and space. We close by noting some of the ways that embracing online learning in a traditional setting has supported our purely online program as well.

Mechanisms for Supporting Emergency Remote Classes

Early in the transition to emergency remote classes, we focused on providing as much information as possible about how to succeed in teaching online in order to support the campus faculty tasked with carrying out the transition. As time moved forward, we shifted to using online infrastructure and staff to more directly support these new offerings. In this section, we describe four of these approaches.

Shared Expertise

When university closings began to occur, numerous seasoned remote educators flocked to share advice for teachers newly moving into a remote environment. At Georgia Tech, this took the form of several rapidly spun up working groups for sharing best practices. I, personally,

participated in such groups with multiple schools on campus, including one with our College of Engineering, far-removed from my department; but the presence of expertise and familiarity with online teaching from a fellow faculty member immediately translated into live, direct advice for others. Many of the ideas we championed were put into immediate action; most prominently, we shifted the default mindset more toward asynchronous content creation presented in a synchronous environment. We describe this as a "hosted" model, with "hosted" drawing an analogy to talk show hosts who introduce different guests, performances, and video segments. Under this hosted model, a faculty member would pre-record a well-structured presentation of the core course content; this prevented technological problems from having an impact on synchronous students and ensured that the faculty member was comfortable with the product before they actually made it visible. Once produced, the faculty member would present it in a live environment, typically through the video sharing option in BlueJeans, a popular teleconference system; they would introduce the video ahead of time, answer live questions after the video, and interact in the chat box during the video. This model leveraged the benefits of creating polished content in advance, but also preserved the benefits of synchronous interaction among students and instructors. In fact, this model allowed greater direct interaction between students and instructors, as instructors could effectively be "in two places at once", lecturing through their video and simultaneously answering questions in the chat. Pre-recorded content also tends to be more efficient, opening more synchronous time for student questions or collaborative work. This model has been noted to represent a new development in what has previously been a relatively mutually exclusive dichotomy between synchronous and asynchronous (Dahlstrom-Hakki, Alstad & Banerjee, 2020; Hrastinski, 2008), leveraging the best of each possible medium rather than choosing between then as alternatives.

In addition to private meetings directly with other faculty, we also created public materials usable by faculty at Georgia Tech and at other institutions. For my part as the Executive Director of Online Education in Georgia Tech's College of Computing, I wrote three pieces that I have heard referenced several times: Five Tips for Moving Courses Online Quickly (Joyner, 2020a), a "quick-start" guide to simple tricks to be a successful remote teacher; Safe, Familiar, Student-Centric—An Emergency Guide to Remote Teaching for Novices (Joyner, 2020b), a more comprehensive guide to transitioning residential courses to a remote environment including their course content, assessments, and administration; and Designing Trustworthy Assessments without Proctoring (Joyner, 2020c), a guide to designing assessments that offer an assurance of academic integrity even in the absence of proctoring.

The guide “Safe, Familiar, Student-Centric” was also presented in a number of workshops, including the AWS Educate webinar series and J-WEL webinar series.

Through these efforts, the knowledge and skills developed through the first six years of our online MSCS program were extended both to our own faculty and to the world at large. What is particularly notable here, though, is that the majority of our advice was not on how to teach the way we do in the OMSCS program; in our program, we operate purely asynchronously with enormous lead-in time on course production. Instead, the advice was constructed collaboratively to transfer the positive experiences in a purely online program into this emergency transition. For example, the “hosted” model is not something we have used extensively in the online program because our students enter expecting a purely asynchronous interaction; the on-campus program by contrast enrolled students expecting live interaction, which created both an expectation to meet and an opportunity to leverage. The hosted model was devised to maximize the benefits of both environments; it went on to inspire a new paradigm of classroom distribution we will share in the second half of this chapter.

The Remote Teaching Help Desk

Moving into summer, our attention shifted to setting up a more comprehensive infrastructure for supporting our newly-remote faculty. During a normal semester, we employ almost 100 instructional associates, alumni of the OMSCS program who have continued to work as teaching assistants for various classes. Many of our courses are not offered in summer, however, because the summer semester is shortened and some courses are too demanding for the truncated semester; during these months, those courses’ instructional associates are typically not working.

For Summer 2020, we asked three instructional associates whose classes were not offered if they would act as a sort of “help desk” for College of Computing faculty teaching remote classes in the summer. To each of these three instructional associates, we assigned ~12 faculty members, offering their assistance not just answering questions, but also setting up tools, writing policies, and debugging remote technology. These instructional associates had ample experience with the tools that remote instructors would need to learn, and we felt that having a dedicated person to support these efforts for each instructor would be more efficient than either do-it-yourself guides or a more general help desk. They further helped convert other existing online material to a more open format.

Through this effort, the online program was able to support the in-person program by offering up dedicated experienced online instructional associates to work on these classes. This went beyond simple feedback and advice on the opportunities and challenges of transitioning

online; these individuals were able to actually proactively work on the courses undergoing this transition.

The Case of CS4641

Due to a combination of factors related to COVID-19, one of the courses—CS4641, an undergraduate machine learning course—that was taught remotely in the Summer of 2020 lost its instructor halfway through the semester. Individuals qualified to teach machine learning are extremely hard to come by, and indeed, no other faculty members were available who could take over the class for the remainder of summer.

To resolve this, we turned to the online program. Miguel Morales is an instructional associate in the online program, working on the class CS7642: Reinforcement Learning. Not only has Miguel worked as a teaching assistant for CS7642 for several years, but he also has written a textbook on deep reinforcement learning; his skillset goes far beyond the typical teaching assistant. Miguel lives in Colorado, but because the summer semester is remote for everyone anyway, he was able to take over many of the instructional duties for CS4641 for the remainder of the Summer 2020 term, in collaboration with another institute faculty member that oversaw the course as a whole in a more traditional fashion. Miguel taught remotely via teleconference twice a week and interacted with students on the course forum; along with the other institute faculty member, he also worked with the course's dedicated teaching assistants, themselves remote from the rest of students in the class as well.

Through this effort, the online program was able to support the in-person program by actually supplying an individual capable of delivering the course content to an entire class, uniquely qualified in both domain knowledge and online teaching experience. He was only able to take the role because the remote environment allowed him to present to the class from Colorado. This brought up the question, however: Miguel is uniquely qualified and a gifted lecturer, is it not odd that it is only because of this emergency situation that he was able to have this impact? Would we not want him to be able to teach under normal circumstances as well?

Georgia Tech-Shenzhen

Jumping forward to Fall 2020, the constraints and demands changed. In some ways, the transition in Spring 2020 was simpler because the replacement was one-to-one: residential classes were replaced by remote classes. In Fall 2020, the ecosystem was more complex: some classes were residential, some classes were hybrid, and some classes were purely remote. What is more, those hybrid classes (at least at Georgia Tech) were required to be doable by any purely remote students to accommodate international students unable to come to

campus due to visa issues or travel restrictions. They also needed to be designed to make it as easy as possible for students to miss individual classes if forced to undergo a quarantine period after exposure to COVID-19.

One of the major places this dynamic became relevant was with students in China. Many students who would have attended Georgia Tech in Fall 2020 were unable to come to Atlanta because of travel restrictions and halts to visa processing. What was their alternative? Take a year off? Go to a different school instead? These were obviously undesirable alternatives for both students and the institute.

Fortunately, at our service were three undergraduate CS classes that had been developed for online delivery years prior. The longest-running of these, CS1301, was developed by me in 2016 and has been thoroughly researched; we know that learning outcomes from this online CS1301 were equal or better than those of the traditional version of the class (Joyner, 2018b; Joyner & McDaniel 2019). Students in these three undergraduate CS classes typically consume their lecture material asynchronously online, but then attend synchronous recitations and interact on course forums with instructors and teaching assistants.

Thus, to accommodate students in China who were unable to come to Georgia Tech in person, we instead opened up dedicated sections at the Georgia Tech-Shenzhen campus. Here, students would still meet in person, interact with their own dedicated teaching assistants, and attend recitations, but they would do so as part of broader enrollment in online classes that had been developed years prior. Just as if they had been in Atlanta, they were still able to interact directly with instructors and Atlanta-based TAs via the forum, and they were graded with the same expectations as if they had been in Atlanta as well. In every way, the credit they earned was identical, dramatically limiting the impact of COVID-19 on their learning and progress toward their degree.

Through this effort, students unable to come to Atlanta to start their full college education were nonetheless able to start or continue their progress toward their degree, bolstered by our other online offerings; and what is more, they did this without missing out on elements of the in-person experience. They still attended the course from a campus environment, just one that they did not share with the Atlanta cohorts of students. In fact, due to local restrictions in place at the time, the students at Georgia Tech-Shenzhen were the *only* students to have an in-person recitation; enrollment numbers and classroom capacity, as well as heavier requirements for social distancing due to local conditions, meant that students in the Atlanta section attended their recitations online.

Towards a Distributed Classroom

There are two ways we can view the mechanisms we described in the section above. In one sense, we can view them with a relatively shallow mindset: we had access to experts in online teaching, and so we asked them to help others out. I helped faculty out with their own transitions. Our instructional associates partnered with faculty on their remote teaching work. A remote instructional associate presented to a remote class when needed. We let more remote students use our online material while forming their own local cohorts.

However, we can also think about these interactions more deeply. These mechanisms are not merely useful when handling a rapid transition to remote learning: they provide some inherent benefits that can be generalized to a typically-functioning classroom as well. The expertise developed by a vertically-scaled online program, along with the rapid need to transition in-person instruction, created an environment where innovation and improvement can occur in a durable way that may extend beyond the current crisis. This section describes these benefits, then contextualizes them within the paradigm of a classroom distributed across time and space.

Asynchronous Access to Content

So-called lecture capture has been around for decades; under this mechanism, cameras and microphones record an in-person lecture and make it available to other audiences. These recordings are often afterthoughts, however: a stationary camera and subpar microphones generate a raw recording that marks off that the lecture was recorded but with little attention to practical usefulness and reusability. There are exceptions, of course, such as the state-of-the-art distance learning classrooms at Georgia Tech Professional Education's Global Learning Center and elsewhere on campus, but these are dedicated to the needs of Georgia Tech's distance learning programs rather than heavily leveraged in normal operations.

The push for hybrid classes in Fall 2020, however, means more attention has been paid to the quality of these recordings. The primary function of these recordings is supporting a remote, likely asynchronous audience, whether due to temporary factors like a quarantine or illness or more persistent obstacles like travel restrictions. The recordings are generally available to the in-person students as well, though, which provides a key benefit: classroom content is no longer a scarce resource. Without a recording, students are expected to be in the right mindset for learning every time a class meets for weeks on end, and to understand the material right away: if they do not, the lecture has passed, and they are left without a persistent resource from which to study. With a quality recording, students are able to rewatch content if

they were unable to understand it the first time, whether due to their own difficulties with the content or due to external factors.

This asset may expand even more when following the “hosted” model I described previously. Under this model, a teacher may film the core course content in advance; during a synchronous class time, they then play the core content, answering student questions live and pausing for students to work on problems themselves. This preserves the ability to generate a comfortable, vetted video about the core content while also getting to interact with students live during the presentation. The core content then becomes asynchronous available, further supporting students’ ongoing learning. For teachers who teach the same class multiple times per day, this also provides a significant time savings: rather than re-delivering all content throughout the day, they may record it once and use it multiple times. For remote students residing in other time zones, this may also open the ability to offer more “sections” as adding another time does not obligate the teacher to reteach the content, but rather just to be on hand for questions.

Remote Instructors

As seen in the example of Miguel Morales presenting to an otherwise-residential section of CS4641 in the summer and the instructional associates serving as a remote help desk for faculty based in Atlanta (but teaching remotely), an additional benefit of these arrangements is the ability to distribute teaching staff. Under a traditional model, teaching a college class requires a person to commit to being in a certain place at a certain time multiple times a week for several weeks in a row. This precludes many professionals and practitioners from also working as teachers. Our experience in the OMSCS program—especially the ease with which we attract teaching assistants (Joyner 2017)—has shown us that experienced professionals like Miguel would generally like to give back to the community by teaching, but the inflexible requirements prevent them from doing so.

Under a remote teaching model, however, more such individuals may be brought into the instructional fold. Synchronous presentation may still be needed but, removing the need to physically travel to a campus, especially during a regular working hour, tremendously increases the ability of qualified professionals to support the teaching process. We have seen this during the pandemic as well: one of the developments has been a greater ease with which guest lecturers may be invited because such an invitation does not require the guest to visit in person, but rather just to sign on at the right time. If entire classes can run on remote teaching models, then the pool of potential instructors expands tremendously.

This is not necessarily restricted only to entirely remote classes. A couple years ago, I delivered a guest lecture to a class at Carnegie-Mellon University, but I did so remotely; the instructor in the classroom put my presentation feed on the screen and pointed his camera at the class; I was able to see the class to which I was presenting, and answer questions live. In this way, a remote teaching model could be leveraged even to support in-person classes, retaining the types of in-person discussions and groupwork that typically thrive in synchronous co-located classes.

Remote Cohorts

In the example above, though, what makes the instructor 'remote' and the class 'co-located'? Is the class not itself remote from the instructor? In the example above, it seems obvious: I am alone in my office, and the class to which I am presenting is meeting at the same place every week. Clearly, they are the 'home' of the class, not me.

But in another one of our examples above, the dynamics are a bit different. Our cohorts in Shenzhen meet synchronously with one another in the same classroom; that synchronous meeting, however, is augmenting their enrollment in an existing online class, where communication is facilitated asynchronously. The Shenzhen location is not the "home" of the class in that the class predated the section, and yet students in the Shenzhen section interact in a way that others do not, with their own dedicated in-person recitation mirroring the in-person recitation typically offered at the Atlanta campus (prior to the pandemic).

By contrast, the typical online model we use in OMSCS has students around the world use pre-recorded content to participate in a class, communicating asynchronously with instructors and classmates via learning management systems and forum tools. The online model thus expands access, but at a cost: the in-person synchronous classroom experience is lost, replaced by asynchronous remote communication. If remote cohorts can reintroduce the synchronous classroom experience, however, then we may achieve the best of both arenas: students retain the asynchronous access to the original teacher as they would in a typical online class, but also may interact with a teaching assistant and a cohort of their own local classmates for team projects, group discussions, and other direct, synchronous interactions. Thus, students no longer need to commit to moving to Atlanta in order to include live interaction with classmates as part of their curricular experience, minimizing what portions of the experience they must relinquish in order to participate within their constraints.

The Distributed Classroom

If we tie these different initiatives together, we start to see something groundbreaking emerge, what we have come to describe as a distributed classroom. The distributed classroom, by our definition, is a classroom experience distributed across time and space. The teacher need not be in the same place as the students, and the students need not be in the same place as each other. The teacher might teach synchronously to students physically in the same room, synchronously to students in remote locations, or asynchronously in general. The typical barrier of needing to be in the same place at the same time fades.

This might seem just like typical asynchronous online learning, where students watch lectures from their homes instead of coming to the classroom and interact via forums or chat rather than face-to-face. The key to the distributed classroom is that it is distributed across these spectra rather than constrained within one. What that means is that a teacher may be teaching synchronously to a co-located class of students, but that class may be livestreamed to another cohort of students in a different location, as well as live-streamed to a synchronous remote audience. Each of these groups may have its own teaching assistants to support their own interactions and discussions, built on the foundation of the live lecture; these teaching assistants then may help facilitate live interaction between the remote cohorts and the teacher, curating questions to pass along while answering more low-level questions directly. All cohorts similarly would continue to interact with the instructor and full teaching team via asynchronous mechanisms outside of class, or even through dedicated synchronous remote interactions such as a dedicated remote office hours session.

Then, once the lecture is prepared for streaming, it may easily be recorded as well, allowing more fully asynchronous cohorts of learners to participate both with the course content and with the instructional team. For example, a section in Shenzhen might watch course content on a 12-hour delay due to the time difference, or a section of remote adult learners who sign onto BlueJeans together in the evening may watch the morning's content together. In both these contexts, dedicated instructional support would be available to facilitate and structure these interactions, as well as answering those questions that can be answered by an individual with knowledge at the level of a typical teaching assistant. All of these interactions are clearly optional: it remains entirely possible for a student to interact with classmates and instructors through asynchronous mechanisms only as in our existing distance learning classrooms. However, these optional synchronous interactions enhance the experience, reintroducing the social learning that students needed otherwise to give up in order to access the program in the first place without moving to Atlanta or committing to classes during work hours. All these

students may then interact with one another and with instructors on shared course forums like Piazza, submit their assignments to the same learning management system, and receive grades and human feedback from the same team of human teaching assistants. This is the distributed classroom: an attempt at distributing not just learning across time and space, but the actual classroom experience—including synchronous interaction—even while removing the requirement to attend at a certain time and in a certain place.

Conclusion

While this chapter has focused on the ways that the existence of our large online programs supported the rapid transition to remote teaching in 2020, the online program has benefited as well. We have seen how increased comfort with teaching online has led more faculty to want to develop their own online courses. In many cases, these may even be developed using material they created to teach their initial online class; for example, in Fall 2020 we began teaching CS6457 online using material that the instructor developed to teach the class remotely in Summer 2020. For other classes, even if the material is not usable as-is, it provides a far more valuable prototype and structure to use to support a fully online development.

But the largest sea change we see as a result of these trends is a general blurring of the lines between online and residential education. While the two have often been thought of as discrete categories, bridged only occasionally by dedicated distance learning classrooms, the lines have blurred tremendously. This trend was already under way, with learning management systems and course forums distributing assignment submission, grading, and course Q&A across time and space, but stronger delineations existed regarding the classroom experience itself. But as we see more efforts toward remote instructors, remote students, and remote cohorts, it is becoming clearer that a classroom experience can be distributed across time and space as well.

References

Dahlstrom-Hakki, I., Alstad, Z., & Banerjee, M. (2020). Comparing synchronous and asynchronous online discussions for students with disabilities: The impact of social presence. *Computers & Education*, *150*, 103842.

Goel, A., & Joyner, D. A. (2016). An experiment in teaching cognitive systems online. In D. Haynes (Ed.), *International Journal for Scholarship of Technology-Enhanced Learning 1*(1).

Hrastinski, S. (2008). Asynchronous and synchronous e-learning. *Educause Quarterly*, *31*(4), 51-55.

Joyner, D. A., Goel, A., & Isbell, C. (2016). The unexpected pedagogical benefits of making higher education accessible. In *Proceedings of the Third Annual ACM Conference on Learning at Scale*. Edinburgh, Scotland.

Joyner, D. A. (2017). Scaling expert feedback: Two case studies. In *Proceedings of the Fourth Annual ACM Conference on Learning at Scale*. Cambridge, Massachusetts.

Joyner, D. A. (2018a). Squeezing the limeade: Policies and workflows for scalable online degrees. In *Proceedings of the Fifth Annual ACM Conference on Learning at Scale*. London, United Kingdom: ACM Press.

Joyner, D. A. (2018b). Toward CS1 at scale: Building and testing a MOOC-for-credit candidate. In *Proceedings of the Fifth Annual ACM Conference on Learning at Scale*. London, United Kingdom: ACM Press.

Joyner, D. A., & Isbell, C. (2019). Master's at scale: Five years in a scalable online graduate degree. In *Proceedings of the Sixth Annual ACM Conference on Learning at Scale*. Chicago, Illinois, USA.

Joyner, D. A., & McDaniel, M. (2019). Replicating and unraveling performance and behavioral differences between an online and a traditional CS course. In *Proceedings of the ACM Global Computing Education Conference (CompEd)*. Chengdu, China: ACM Press.

Joyner, D. A., Isbell, C., Starner, T., & Goel, A. (2019). Five years of graduate CS education online and at scale. In *Proceedings of the ACM Global Computing Education Conference (CompEd)*. Chengdu, China. ACM Press.

Joyner, D. A. (2020a). *Five tips for moving courses online quickly, from an OMSCS instructor*. Retrieved January 4, 2021 from Georgia Tech News Center. https://news.gatech.edu/2020/03/17/five-tips-moving-courses-online-quickly-omscs-instructor

Joyner, D. A. (2020b). *Safe, familiar, student-centric—an emergency guide to remote teaching for novices* (Blog Post). Retrieved January 4, 2021 from https://medium.com/@david.joyner/safe-familiar-student-centric-an-emergency-guide-to-remote-teaching-for-novices-part-1-939c23afd65a

Joyner, D. A. (2020c). *Designing trustworthy assessments without proctoring* (White Paper). Retrieved January 4, 2021 from https://blog.ctl.gatech.edu/wp-content/uploads/sites/852/2020/05/Designing-Trustworthy-Assessments-without-Proctoring.pdf

SECTION II

Strategy and Change Management

Strategic Leadership and Partnerships to Scale a Remote Teaching Infrastructure Rooted in Jesuit Values

Kelly Otter[a] and Shenita Ray[b]

Abstract

Given Georgetown University's School of Continuing Studies' experience and success marketing, recruiting for, developing, managing, and scaling online programs, in several distinct ways, SCS led, coordinated, and contributed to efforts to help the University navigate the unprecedented effect COVID-19 had on every facet of the institutional enterprise. Applying core Jesuit values such as cura personalis (care for the person) and cura apostolica (care for the institution), SCS endeavored to balance navigating strategy and change at the School level while also serving as a strategic partner at the institutional level. As SCS continues to chart a path in an increasingly unpredictable world, we are recalibrating and refining our strategy to capitalize on local, national, international lessons learned about creating a thriving organization in the midst of uncertainty.

Keywords: Strategy, leadership, values, organizational-change, higher-education

Serving as a Strategic Resource and Thought Partner Across the University

When the pandemic in the Spring 2020 term forced schools and workplaces across the world to go virtual, concurrently, the School of Continuing Studies (SCS) redesigned and restructured more than 240 courses for remote delivery formats and began serving as a strategic resource and thought partner for schools and academic and administrative units across the University. Early in the spring of 2020, SCS encouraged its faculty to be prepared to teach remotely in the fall, before we announced the school would operate virtually. Thus we immediately began formulating a strategy to accomplish this. At the same time, we were working to share knowledge of the model we were building with the larger university community for which teaching with technology was a new and unfamiliar venture. The experience of developing more than 160 online master's courses in five years positioned SCS to lead, coordinate, and contribute to efforts to help the University navigate the unprecedented effect COVID-19 had on every facet of the institutional enterprise.

While SCS has experience building programs at scale using the edX platform, the School does not employ a MOOC model. Online courses are designed with primarily

[a] Georgetown University, otter@georgetown.edu, ORCID: 0000-0001-8428-8918
[b] Georgetown University, sr1041@georgetown.edu, ORCID: 0000-0002-1404-6582

asynchronous elements so as to serve students across time zones. Further, courses are designed to be taught by one faculty member with a maximum of 25 students, to ensure a high level of faculty to student and student to student interaction. The SCS course development model is scalable: within five years the School launched 13 online master's programs using a collaborative and cross-functional team approach. We worked with an external partner to transition three existing programs online and, at the same time, gradually built an internal infrastructure to support the design, development, and implementation of online programming. We constructed an instructional design and faculty support team beginning in 2015 with a director of online programs to a team of seven including designers and multimedia experts. Concurrently, we designed marketing, communications, and outreach strategies, as well as student support structures, to address the unique needs of learners at a distance. Each new master's degree program is simultaneously launched in two formats: in-person and online. Online enrollments grew from one program in January 2015, to 13 in 2020 with approximately 1500 students taking at least one online course per year.

Shared and Differentiated Challenges

The primary challenge was to concurrently scale remote learning at the local and university levels, given varying experience and interest in technology-mediated education. While there is an internal infrastructure at SCS to build asynchronous online courses, the team was already working at capacity creating new programs scheduled for launch in the summer and fall. The team included five instructional designers and two multimedia experts. To develop one asynchronous online course requires, on average, 10 hours per week from the design team and more than 100 hours from the faculty member. Hence, at the time, the School did not have a dedicated infrastructure to support scaling remote courses.

SCS makes a distinction between the attributes of online courses (asynchronous modules, authentic and applied projects, case studies, group assignments, custom multimedia elements, opportunities for voluntary synchronous sessions etc) and high quality remote courses. In the spring, most faculty teaching face-to-face simply substituted in-person sessions with teleconferencing tools, which sought to preserve interaction and engagement, but had inherent limitations, was overused and led to faculty and student exhaustion.

Despite the School's familiarity with the complexities and nuances of online learning and teaching, many of the challenges SCS faced in the early days of the pandemic and into the summer months were similar to those the University was in the midst of solving:

- Faculty readiness for teaching remotely;

- Student readiness for learning remotely;
- Accelerating the build of quality remote courses;
- Fluctuating guidance to support international students;
- Impact of virtual learning on enrollments.

Compounding these issues were differences across campus in regard to the mission and purpose of teaching with technology. The University's central teaching and learning support unit is designed to serve individual faculty members across the institution, and to research and explore a variety of approaches to teaching and learning using technology. The SCS model is the inverse of that: a scalable model that preserves faculty time, energy and expertise for subject matter teaching and students; and makes decisions about course components with the instructional design team. We defined the attributes of, and made distinctions among face-to-face, online and the various models of high-quality remote teaching. The attributes of the remote teaching models are unique and are not reflected by those at the polarities: face-to-face and online.

Comparable to SCS, but with a larger scope, critical challenges for the University encompassed raising awareness of the attributes of various technology-mediated modalities and building a scalable model to create upwards of 2,000 remote courses. Given the speed of the transition to instructional continuity, the majority of remote courses in the spring simply substituted in-person classes with synchronous Zoom sessions. This common experience, shared by many students across the university and the nation, had mixed reactions and responses. A frequent complaint was that numerous synchronous sessions a day and week led to fatigue, which for some, increased stress levels and challenges that inhibited participation. Further, many faculty felt compelled to lecture for the full class period as they would in person, exacerbating student fatigue and disengagement. SCS immediately began to consider the best method for supporting faculty in the process of teaching robust, highly interactive courses in a virtual environment, and to empower them to achieve quality in a modality that was a mix of in-person and online methods.

Despite SCS's experience growing online programs, redesigning and restructuring hundreds of courses for a remote environment was challenging. The online infrastructure was primarily designed to support the development of asynchronous online courses. For the University at-large, faced with nearly ten times the number of courses needing to be refactored with a proportionally smaller online support infrastructure, this was a monumental challenge. Thus, SCS designed a strategy to support the conversion of its face-to-face courses to remote formats, while also serving as a partner to the enterprise-wide effort. It was based on a three-

pronged approach: creating a remote course template faculty could use to rapidly develop, deploy, and transition a face-to-face course to a remote class; restructuring and training existing internal personnel to support the transition for all full- and part-time faculty (400+); and establishing a faculty development program to provide weekly and one-on-one instruction on online pedagogy.

Shared and Differentiated Strategic Goals

Three stages were used to develop the School's online program: first, SCS partnered with an Online Program Manager (OPM) to launch the first three programs online; second, it collaborated with the University's teaching and Learning unit to develop a cohort of programs; and third since the launch of the first program with an OPM, SCS had been currently developing an internal instructional design infrastructure. Each term, SCS offers approximately 400 credit-bearing classes, taught by 20 full-time faculty and nearly 400 adjuncts. Approximately 50 percent of the School's for-credit courses are delivered online. These courses were created to be asynchronous with limited synchronous components to allow students from multiple time zones to participate equally. While online courses are a significant component of the School's enrollment, in-person classes are equally vital to serve the diverse student population. For the University at-large, the residential experience is privileged, and face-to-face courses are the predominant mode of instructional delivery. Thus, SCS and schools across the institution endeavored to create a strategy to transition face-to-face courses to remote learning. Ultimately, the shared goal was to design classes inclusive of asynchronous and synchronous components that would augment the structure to achieve higher levels of interaction and engagement.

While the instructional design aspirations among leaders across the university were similar, because of the contrasting values and missions in regard to in-person and online instruction, the audiences and implementation strategies differed. The priority for the majority of schools was to work toward the preservation of the face-to-face model through remote means in order to meet the needs of traditional, residential learning communities. This was the underlying sentiment reflected through symposia, workshops and webinars to help faculty with the transition. Essentially, faculty were invited to explore pedagogical approaches and design principles and to create courses in a virtual environment through that creative, thoughtful process.

In contrast, the mission of the SCS online infrastructure was to meet the needs of its diverse audiences: the strategic goal was to adapt the School's teaching and learning model to the conditions in which learners could best access quality education and in which faculty could

expand pedagogical expertise and reach more students through technological means. Our approach was guided by these principles:

- The course design model should adapt as conditions and exigent factors shift;
- Course attributes and pedagogy will remain consistent: engagement, interaction, values, reflection, achievement of community, competencies, will be foregrounded;
- Faculty will focus on subject matter, teaching, students; the design and build process will circumscribe and support the faculty role;
- The School will scale horizontally, which includes expanding the notion of and design models of remote teaching, so there emerged a vast middle space of quality remote options, both synchronous and asynchronous;
- Horizontal scale also means experimenting with new and iterating on existing instructional design methods to transform teaching and learning across SCS's portfolio of programs.

While the number of courses SCS transitioned to a remote learning environment was proportionally smaller compared to the total of other schools at the University, the goals SCS earmarked during the initial stages of long-term instructional continuity served as a platform for the School's leadership to collaborate with the University:

- Raise awareness and change the language across the instructional community about the distinctions among online, remote, and in-person courses substituted with synchronous tools;
- Create a master course with research-based components and tools based on best practices that can easily be cloned and replicated on a mass scale;
- Establish a train-the-trainer model to scale the institution's technical and faculty support capacity;
- Conduct an inventory of staff and faculty positions to identify capacity, skills and knowledge that are transferable, so as to train and redeploy them as a faculty and course development support team;
- Create rubrics to guide faculty in the assessment of quality of remote courses and to coach part-time faculty in the course development process;
- Contribute to and elevate the institution's knowledge of quality technology–mediated education through faculty governance forums and teaching excellence symposia and workshops;
- Design tools to aid faculty in translating contact hours into engaging and interactive, synchronous and asynchronous activities;

- Advance marketing and enrollment management's focus on online programs.

Shared Values and Beliefs in Action

The strategic goals SCS articulated during the pandemic are underpinned by a common set of values and beliefs shared across the University's diverse community. Georgetown is a Catholic, Jesuit institution. We pursue a holistic approach to education, prepare students to serve as leaders and agents of change in the world, and commit to social justice as a core principle intrinsic to everything we do. Georgetown's students, alumni, faculty, and staff aspiring to be contemplatives in action is fundamental to animating our values, beliefs, and mission. While there are ten Schools comprising the institution, the pandemic reinforced the notion that we are One Georgetown. Reflecting cura apostolica, a Jesuit value referring to the care to be given to the work and commitments of the institution, SCS accepted invitations to speak to and serve on university-wide COVID-19 related committees and proactively engaged with faculty, staff, and university leaders to ensure the institution would continue to thrive.

The need to move all instruction to remote methods created concerns among faculty across the university about the extent to which the "Georgetown Experience," grounded in Jesuit values, could be animated in a virtual learning environment. They sought strategies and solutions to enliven these signature values while engaging with students at a distance. SCS had been pursuing this work at the school-level since 2016. In collaboration with the Associate Director of Ignatian Formation, SCS developed a framework titled, "Strategies to Integrate Jesuit Values into Online and On-campus Courses" (Novak & Ray, 2017). This document serves as a guide in the design and implementation of all online courses.

SCS contributed to university-wide efforts to navigate the challenge of assuring that a values-based education could be preserved despite the distance required to assure safety and the increased reliance of technology to bridge that distance. We used university-wide platforms, such as the Main Campus Executive Faculty (MCEF), the highest governance body on the Main Campus of the University, to showcase SCS designed processes, tools, and practices. Additionally, SCS leaders gave presentations at university forums on a number of topics, including creative approaches to deliver synchronous and asynchronous content, and techniques to estimate contact hours and student engagement in virtual learning environments.

As a result of regular participation in university-wide meetings, SCS learned of wide-spread challenges faculty faced across the institution. Faculty raised concerns about how to teach effectively remotely; how to assess student engagement and learning in online courses; how to recreate the Georgetown spirit and experience virtually; how to calculate student work time; and how to expedite the development of remote course development. Given SCS's prior

experience in these areas, the School partnered with central units serving all academic units across the University. The two primary divisions SCS worked closely with included the teaching and learning unit and the Office of the Registrar, which was charged with creating codes for course modalities that aligned with the methods through which the courses would be delivered, as well as external regulations for in-person requirements. Through regular meetings and consultation, we co-created instructional design templates, planned faculty training sessions, and conceptualized shared definitions of course design models.

Strategic Implications of COVID-19 and Change

COVID-19's impact on SCS's strategy was wide-ranging. It revealed segments of the School's faculty population which required foundational training on online teaching to successfully transition to a remote instructional environment; it exposed essential functions such as academic operations, student affairs, and online learning which were in immediate need of increased resources to manage the implications of the pandemic on students, faculty, and staff; and it elevated the urgency to continue to embed the university's Jesuit values into the School's decision making processes and refine communication practices to be faster, nimbler, and cross-functionally inclusive across hierarchical levels.

Challenge 1: Faculty Preparedness Across the Portfolio

In the Spring of 2020, when the School was faced with transitioning all face-to-face courses to a remote learning environment, one of the first metrics the leadership team sought to quantify was the percentage of courses available in an online or hybrid learning format. While the School's vertical growth of online programs focused primarily on bachelor's and master's degrees, SCS's portfolio is diverse and serves multiple markets. More than 70 percent of the students SCS serves enroll in non-degree programs, yet the vast majority of these offerings were not designed for online teaching and learning. In comparison, SCS offers 18 Master of Professional Studies (MPS) and executive education programs, fifteen of which were designed for online delivery. Thus, when the pandemic forced schools and workplaces around the world to go virtual in March 2020, within days SCS converted 245 credit and non-credit courses to remote delivery formats, and later moved similar numbers in the summer.

The faculty preparedness challenge was three-fold: one, how to quickly redesign face-to-face courses for remote delivery; two, how to implement just-in-time training to teach faculty competencies of exemplary instruction in an online learning environment; and three, how to differentiate faculty training reflective of the diverse design models across the School's portfolio of product offerings. To illustrate, at the beginning of instructional continuity, while more than

80% of faculty members in credit-bearing programs had prior online teaching experience, only a fraction of those in the professional development space (non-credit programming) had similar skills.

Challenge 2: Demand on Essential Functions

The second significant consequence of the pandemic on SCS's strategy was that it revealed essential functions requiring additional support and resources. Many divisions including academic operations, academic affairs, faculty affairs, student affairs, and online operations were routinely confronted with new COVID-19 related policies, projects, practices, and processes influencing how students learn and how faculty teach. In turn, these dynamic and unprecedented changes not only required staff to quickly learn and adapt to unfamiliar landscapes, it also necessitated additional resources to do so. More pointedly, leaders of the School's units found themselves in immediate need of skilled staff to contribute to the analysis, implementation, and oversight of initiatives designed to mitigate the risk of the pandemic having outsized repercussions on student learning and grades. To demonstrate, immediately following the decision to move to instructional continuity in Spring 2020, the University approved new pass/fail and withdrawal policies, as well as temporary probation and dismissal policies, requiring all Schools to adopt and tailor the protocols to their student and faculty populations. The effort to inform, implement, and monitor new policies was both time and resource intensive. It required cross-functional collaboration across the School and the University.

Another example to illustrate the resource demands COVID-19 placed on essential functions is in early summer, students intensified appeals for greater clarity around how courses would be structured in Fall 2020. Specifically, they were interested in more nuanced descriptions of faculty engagement and synchronous and asynchronous content embedded in remote classes. From the students' perspective, this qualitative data was useful in terms of better informing their course selection decisions. Historically, this level of detail had not been provided to students using existing tools, technology, and processes. Thus, to meet this new student request required an investment of cross-functional and cross-institutional collaboration to rethink and redesign systems, processes, roles, and responsibilities.

Similarly, international students who decided or were forced to return to their home countries in Spring 2020, but simultaneously continued their academic studies, were equally concerned about the clarity of course delivery formats. However, these learners were confronted with greater challenges including accessing the University's tools and systems to engage in course work from abroad. Thus, from technology issues, to immigration challenges, to feelings of uncertainty, isolation, and loneliness, international students required greater

attention and focus from academic affairs, academic operations, faculty, and counseling services. To be sure, feelings of uncertainty, isolation, and loneliness were emblematic of sentiments expressed across the SCS student population.

While it seems obvious COVID-19 had a tremendous impact on the School's online operations function, the reasons may not be equally transparent. Not only did the responsibilities associated with the online operations team swell from primarily supporting online courses to also facilitating the development of well-designed remote courses, the team increased its contributions to a cohort of programs developed by an OPM. A component of the School's strategy to transition all face-to-face classes to a remote learning environment was to copy and modify pre-existing content built for online delivery into remote sections of the course. Further, this resource intensive collaborative effort demanded enhanced multimedia design assets and placed greater emphasis on integrating Jesuit values and synchronous engagement into the courses.

Challenge 3: Rethinking Decision-Making Process

The third major effect of the pandemic on the School's strategy was it became increasingly essential for the leadership team to reinforce the importance of embedding Georgetown University's Jesuit values into the School's decision-making processes and refining communication practices to be faster, nimbler, and cross-functionally inclusive across hierarchical levels. Prior to COVID-19, SCS endeavored to flatten the organization's hierarchy and push down decision-making to teams directly impacted by proposed changes and initiatives. While empowering staff to make decisions at the local level helped improve adoption and buy-in, given the reverberations of the pandemic on every aspect of the School's operations, it heightened the need for leaders to calculate the impact of their decisions beyond local boundaries. Leaders found themselves not only having to make decisions much more rapidly, it was also crucial to gather intelligence and input from others across the organization and hierarchical levels. This approach allowed the School to assess and pilot test the up- and down-stream chain reaction of proposed decisions prior to moving forward with implementation. For example, intelligence gathered from surveys of faculty and students allowed program leaders to quickly implement and refine webinars and set up individual consultations. In addition, intelligence gathered from faculty, the academic operations team, and student advisors led to the development of a tool at the local level that facilitated data collection about course structure that was shared with students during advising sessions. Finally, the online team nimbly adapted its training modules for faculty as questions and suggestions emerged. The impact of localizing decision-making is that it increased trust within the community, it inspired more

experimentation, and it fueled a greater sense of pride, ownership, and accountability towards work.

Strategic Responses to the Challenges

The key to the challenge of moving hundreds of f2f courses to remote formats was to create a tiered project management system with differentiated roles and responsibilities.

SCS responded to these challenges in three strategic ways: first, strengthening the School's commitment to embedding and animating Jesuit values in decision making processes; second, deepening faculty director's leadership with new resources and oversight of adjuncts to assure the quality of the teaching and learning experience in remote environments; and third, redeploying and upskilling talented staff to support essential functions significantly impacted by instructional continuity.

Spurred by the global pandemic, the leadership team sought to strengthen the School's focus on integrating Jesuit values into the calculus of how decisions were made across the institution. Faculty and staff recognized that relying on ethics and values such as cura personalis and cura apostolica as the foundation for identifying and analyzing alternatives to solve unprecedented challenges in extraordinary times, would help to assure the quality of the School's collective decision-making processes. To achieve this end, a 25+ member cross-functional team of faculty directors and academic leaders developed shared principles emblematic of the University's Jesuit heritage:

1. Prioritize the health and safety of students, faculty, and staff in a manner which fosters a culture of trust and mutual respect
2. Advance the mission and values of Georgetown University
3. Embody the traditions and practices of academic excellence of Georgetown University
4. Honor the integrity of the classroom, physical and virtual, and the instructor-student relationship
5. Integrate flexible, environmentally responsive, and on-demand instructional strategies
6. Cultivate peer-to-peer learning, build community, and facilitate professional networks
7. Design student experience strategies inclusive of domestic and international learners
8. Leverage technology in scalable and innovative ways to support pedagogic goals and to elevate the school's position in a global landscape
9. Provide ongoing oversight of the quality of teaching, learning, and student experience
10. Animate the spirit of experimentation, agility, reflection, and flexibility
11. Actively engage stakeholders beyond our immediate community to innovate the next generation of best practices in professional and life-long learning

Second, to assure students and faculty of the quality of teaching and learning in a remote learning environment, we sought to deepen the faculty director's oversight of remote courses. The ways in which we aimed to accomplish this outcome were multifold. To advance the quality of instruction delivered remotely through the learning management system and enhance student experience in a virtual environment, two instructional continuity rubrics were developed in collaboration with faculty and academic leaders for use across SCS: The Remote Course and Student Experience Rubric (Ray, 2020). These tools and materials provide guidance to support teaching remotely with a combination of synchronous and asynchronous tools. In addition to training on the use of the tools, faculty leaders were asked to use the rubrics as guides to assess the quality of faculty teaching throughout the term.

Another strategy SCS implemented to safeguard the quality of the student learning experience was the online team, in collaboration with the University's central teaching and learning unit, developed the Georgetown University Canvas Course Template (Georgetown University, 2020) The template was designed to help faculty quickly learn how to create and deliver a remote course in Canvas. The template includes a pre-designed student orientation, sample course module templates, Ask the Professor discussion board, a sample syllabus, a sample instructional continuity syllabus addendum, and relevant faculty training resources to help instructors build course content. Further, to measure the impact of these efforts, SCS designed and implemented instructional continuity surveys to periodically collect data from students and faculty about their learning and teaching experience, respectively.

An additional pillar promoting the School's strategy to demonstrate the rigor and quality of remote courses was an accelerated effort to expand awareness and use of an instructional design framework to integrate Georgetown's Jesuit values (Novak & Ray, 2020) into courses. The purpose of this tool is to illustrate how faculty can use tools and technology to integrate the University's Jesuit values into online and on-campus courses.

Third, the School responded to the implications of COVID-19 on essential functions through redeploying and training existing faculty and staff to contribute to areas significantly affected by prolonged instructional continuity. Faculty and staff from the English Language Center, the operations team, and the Dean's Office were identified to assist academic operations and the online operations teams. For instance, given the speed with which the School needed to scale the number of courses transitioning to remote delivery, four staff members were temporarily assigned to help the online operations team copy and modify pre-existing content built for online delivery into the remote sections of the course. This was a substantial undertaking not only because of the scope and complexity of the work, but also due

to the intensive training needed to teach staff with no experience designing online courses how to successfully contribute to the effort. The infusion of additional resources within the online operations and academic operations teams, specifically, helped leaders rebalance and redistribute responsibilities to bring workloads to manageable levels. Below is a chart summarizing how SCS redeployed existing resources to support functional groups:

Table 1

SCS Redeployment of Resources

Deployed from	Deployed to Support	Projects
English Language Center	Online Operations	Faculty training
Operations Team	Online Operations	Online and remote course preparation
Dean's Office	Online Operations	Online and remote course preparation
English Language Center	Academic Operations	Program Support
Operations Team	Academic Operations	Program Support

The Future: Scale and Innovation in the Midst of Uncertainty

As SCS continues to chart a path in an increasingly unpredictable world, we are recalibrating and refining a strategy to capitalize on local, national, international lessons learned about creating a thriving organization in the midst of uncertainty. One of the lessons discovered is that there are many notions of what online education means across the university. Articulating the gradations within online education is important as it influences pedagogical design, required resources, training, students' enrollment decisions, and most importantly, the student experience. As leaders who have been immersed in designing and delivering online programs for many years at several institutions, we continue to observe that one thing remains constant: the majority of traditional undergraduates do not want to study primarily "online." This does not mean they are unaccustomed to researching, communicating, and socializing with technology. As a generation, they are very tech savvy. It simply means the social environment is crucial to their sense of engagement, belonging, and interactions. On the other hand, graduate students, adult learners, and professional students are at a different stage in life, and while they may prefer to learn in a class, they tend to have more structured lives, more responsibilities, and can readily adapt to variations of online learning environments.

Another important lesson learned is faculty members are eager to learn from other faculty how to integrate asynchronous and synchronous strategies into courses. While some will

simply opt out because they are uncomfortable or prefer not to teach using technology, leveraging faculty as a resource can accelerate the number of educators who have the dexterity and competencies needed to successfully teach in varied learning environments. These skills coupled with the availability of on-demand and research-based templates, tools, and models not only improves the quality of course design, it also expedites the process and leads to the development of resilient organizations

Considering these lessons, moving forward, the School of Continuing Studies aims to sharpen its strategy around five key elements: strengthen relationships with academic divisions and central units to serve as a resource in supporting university-wide efforts to scale online learning; redouble efforts to accelerate the development of new programs to grow enrollments in new and existing markets; invest in the creation of a global, scalable, and agile instructional design models to create pandemic-proof courses; reshape the structure of the School to cultivate the talent and skills needed to support the organization as it flexibly responds to shifts in the global economy; and deepen the School's commitment to social justice and advancing diversity, equity, and inclusion, not just within SCS, but around the globe. At the center of all of these elements is a renewed vision for teaching and learning.

References

Georgetown University. (2020). *Canvas course template.* Unpublished template.

Novak, M., & Ray, S. (2017). *Strategies to integrate Jesuit values into online and on-campus courses.* Unpublished framework, Georgetown University, School of Continuing Studies.

Ray, S. (2020). *The remote course and student experience rubric.* Unpublished rubric, Georgetown University, School of Continuing Studies

.

Jumping the Great Chasm to Quality Online Learning At Scale: Strategic Change Management in a Time of Crisis

Jennifer Schwedler

Abstract

The abrupt disruption to higher education that began in March 2020 continues to produce opportunities to foster creativity and advance fundamental change. At one university in northern California, the continuing education (CE) division saw an opportunity in the crisis and quickly pivoted to further accelerate online learning at scale and advance strategic goals. Led by the existing strategic plan and vision, the leadership of the organization leveraged existing capacity to successfully manage change. This chapter explores the organization conditions, leadership competencies, and the applied practices of one CE organization to respond to change and forge success in an uncertain future. Outcomes include key change management strategies that supported both instructional resiliency and long-term strategy toward accelerating broader online learning and delivery at scale.

Keywords: Change management, online learning, leadership, faculty development, organizational development

Introduction

Transformation is a process, not an event. (Kotter, 2011, p. 3)

Higher education is subject to a fair amount of change, ranging from financial to technological (Kezar and Eckel, 2002). For many organizations, including those in higher education, change is not always planned or welcome, but rather the by-product of external factors (Burke, 2008). The global pandemic of 2020 is just the type of external force that transforms organizations, either devastating them or fostering resiliency to advance fundamental transformation. As organizations across the country transition from emergency response to proactive planning in the face of ambiguity, the capacity of leaders to apply conscious change-management practices at every level of an organization will truly define where they land on the spectrum of failure or success.

When the pandemic closed the doors of universities, most did not command systematic delivery of instruction in online modalities, so they were not prepared to deliver meaningful learning at scale (Lederman, 2020). Despite massive investments in educational technology, higher education had not successfully jumped the chasm (Moore, 1991) to invest in the capacity

University of California at Davis, jen.schwedler@gmail.com, ORCID: 0000-0001-6117-5806

to provide online learning at scale. Though digitally-mediated learning enables universities to reach large populations of learners outside the traditional classroom environment, the pedagogical efficacy of at-scale learning is still the subject of debate (Joksimovic et al., 2018). This skepticism is most keenly observed in the better-known form of at-scale learning, Massive Open Online Courses (MOOCs). But that skepticism gave way to innovation, seeding the early affordable, at-scale models that now power fully-online programs (Pelletier, 2019). Moreover, the systems and devices that gave rise to the popularity of MOOCs provide the very foundation that many universities now rely on to provide remote learning to their student constituencies.

Without access to the traditional classroom pedagogical strategies, which do not scale well (Roll, Russell, and Gašević, 2018), the closure of campuses across the country during the standard instructional cycle, forced universities to embrace online instructional delivery almost overnight. Adopting new pedagogical strategies necessitates new methods of thinking, as technology affords both opportunities and challenges. For those early adopters of online learning, the capacity to scale horizontally was far from easy (Rogers, 2001). Suddenly, those with expertise to deliver online learning found themselves at the center of the maelstrom. Within weeks, larger universities diffused information and support to facilitate adoption of new pedagogical methods, both stabilizing and innovating the instructional landscape.

Under normal circumstances, oft-quoted leadership guru Kotter (2011) would advocate for meaningful application of a systematic process to implement such transformational change. However, the onset of the pandemic as an event itself did not afford organizations the luxury of planning and implementing strategic change efforts. This unprecedented disruption continues to ripple through institutions of learning, many of which appear to be embracing the opportunity to transform permanently. Already accustomed to the volatility of the economy, culminating in the economic downturn resulting from the Great Recession, CE organizations possessed the competency to respond to the crisis (Braverman, 2013). CE professionals had learned in previous periods of disruption to respond through entrepreneurial thinking and innovation. Economic instability led to acquisition of deeper financial and business modeling skills, ultimately innovating traditional instructional delivery to meet the needs of adult learners. CE organizations fit Rogers' (2001) definition of innovators, introducing online learning to higher education through experience, partnership, and enablement (White, 2013). In light of the pandemic, these early innovators became central to the delivering online learning at scale and ultimately providing the resiliency to lead efforts to expand to support emergency remote instruction.

Organizational Context and Conditions

In February 2020, the University of California at Davis (UC Davis), a flagship, land-grant institution in northern California, saw the first patient diagnosed with COVID-19 at its medical center in Sacramento. At the time, instructional disruption emerged as a possibility in the collective conscience of the leadership of the UC Davis Continuing & Professional Education (CPE) division. A self-supporting CE unit with almost 20 years of experience in designing online learning experiences, CPE provides in-person and online education throughout the state and in the capital of California, Sacramento. The organization generates $40 million in revenue annually through state, local, and international education.

Before the pandemic, CPE's fully-online programming accounted for 20% of the division's credit and non-credit offerings. The organization's at-scale reach was largely realized through its 5-year partnership with Coursera, a dedicated provider of MOOCs. Since establishing this partnership in 2015, the at-scale programming at CPE continues to evolve and grow. At present, the portfolio includes individual courses, multi-course specializations, and the first credit-bearing, stackable pathway to a master's degree at UC Davis. The Coursera platform enables CPE to reach more than 1 million learners, creating broader access for learners at both national and international scale. But most importantly, the very nature of at-scale learning opens an avenue for CPE to realize one of its core values: providing access to working professionals. While Coursera's platform facilitates access to top universities for tens of millions of learners, CPE also provides scalable learning through its own technological systems, offering academic certificate programs in business, health, technology, an internationally-recognized winemaking program, and development of its first fully online graduate program.

At the time the university closed its classrooms, 80% of CPE's academic reach was delivered in classrooms across California and in Sacramento. In typical times, CPE offers state entities in-person professional development and adult learners academic certificate programs to upskill and reskill in an ever-changing economy. In a matter of one week, the organization pivoted to a 100% online delivery model, not a small undertaking, as instruction was just wrapping up the final weeks of its winter quarter. With the vertical capabilities of both learning designers and technological systems, students continued learning with minimal disruption. However, the organizational impact of the pandemic profoundly accelerated the division's newly seeded strategic plan, shifting traditional models of educational access and delivery. The transformation, ignited through crisis, created new organizational structures and competencies in online delivery in a matter of months.

Just as content creation for at-scale online learning requires a dedicated instructional team, CPE's Coursera strategy needed investment in staffing. Five years into the Coursera partnership, the same team that grew to accommodate the expansion provided the expertise and capacity to address the pandemic emergency. The Center for Online Education (COE) team, responsible for 20% of CPE's learning portfolio, immediately transitioned to providing horizontal support to 100% of CPE's educational enterprise. Successful delivery of hundreds of sections of courses, inclusive of bootcamps, certificate programs, and statewide workforce development shifted into the COE team's domain of accountability. Within the span of 6 weeks, the team stabilized instructional delivery across a very diverse instructional portfolio, assumed synchronous learning support duties to close out one quarter of instruction, and then went on to professionalize all support services to ensure delivery of high-quality, fully-remote instruction.

At the onset of the pandemic, CPE's executive leadership team included a member with direct oversight of the COE team, an assistant dean. Mobilizing COE to be successful in all directions leveraged two of the most critical components of the people side of change—communication and cross-functional coalition building – both between small groups and individuals. In organizational composition, the assistant dean functioned in a mostly vertical scope, but the crisis necessitated broadened accountability to respond to the event. Though a recognized leader by position, the assistant dean recently accepted the position with CPE. With the needed competencies to respond to the crisis in the COE unit, CPE's dean empowered the assistant dean to facilitate planning and ultimately execution for instructional continuity. Though an untested leader in the division, the academic leadership and staff responded without equivocation to the challenge of continuing educational access and providing support for instructors and students. Thankfully, the cultural fiber found in high-performing CE organizations – agility, entrepreneurial resilience, and partnership – already existed in CPE, creating the pathway to address the challenges that lay ahead (White, 2013).

Applying Thoughtful Change Management

In practice, COE operated in service to the academic leadership in CPE. COE, which was a start-up within CPE almost 20 years before, enabled the organization to produce high-quality online courses and programs. However, the adoption of a core strategic approach to online learning remained a future goal of the division's nascent strategic plan, launched shortly before the pandemic hit. Understanding the limitations of an operational scope and with a lack of direct connection to the academic enterprise, the assistant dean, a certified change manager, approached the assignment with a clear, short-term plan:

- engage in strategic instructional planning and coordination through coalition-building by building awareness of available resources and strategies the COE could provide;
- facilitate buy-in and acceptance of change in the COE team structure; and
- provide clear and transparent communication in multiple directions to connect the entirety of the academic work, including instructors and students, to the competencies of a newly designed COE team.

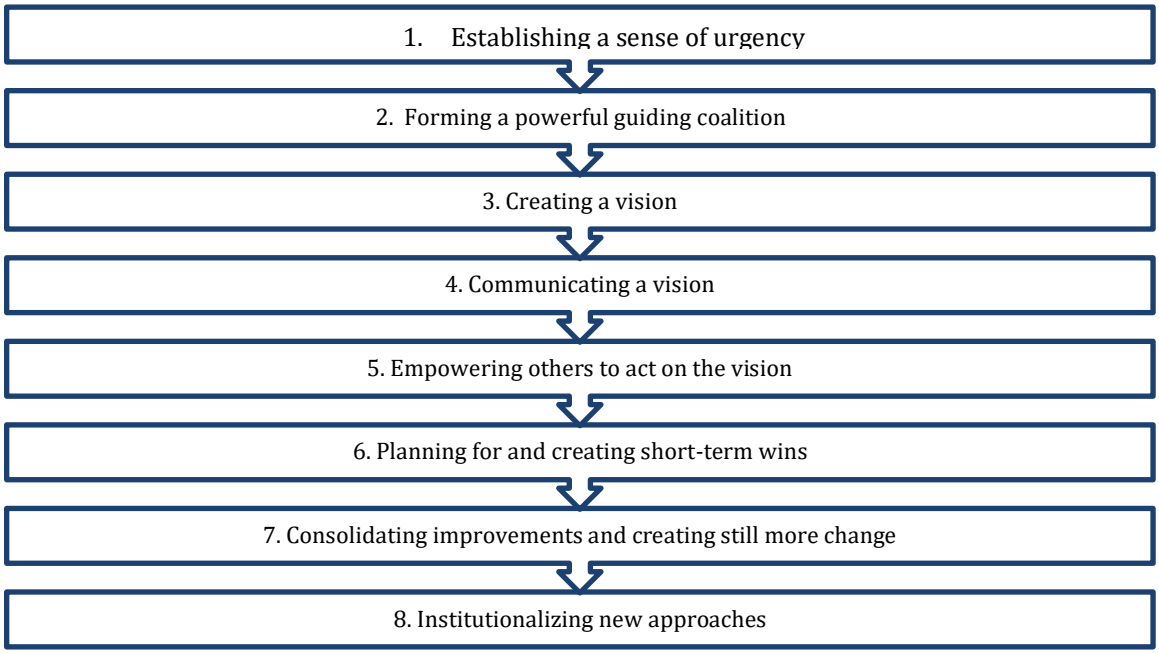
This three-pronged approach, fueled by the crisis, accelerated meaningful adoption of online instructional delivery on a timeline that in more traditional times might take years. The strategic direction of the CPE division, clearly laid out only months earlier at the annual division meeting, provided additional momentum to extend COE's competencies horizontally. The active and visible support of the dean in adopting recommended practices of the team solidified the executive sponsorship needed to ensure successful change management in practice (Hiatt and Creasey, 2012). The dean set the direction, supported the changes through communication and engagement in meetings, and established functional pathways for those decisions to move forward operationally through other senior executives in the division.

Building Multi-Directional Coalitions

Prior to the disruption of CPE instructional operations, COE operated as an online course production unit. Staffed with 8 instructional designers of varying expertise, led by an executive director with expertise in technical infrastructure and operations, the team entered the instructional continuity planning with a strong sense of commitment to the horizontal work at hand. That work, however, necessitated a change in team structure. As the direct supervisor of the team, the assistant dean did adopt Kotter's (2011) principles for transforming an organization, *Figure* 1, although initially applying them quickly to facilitate planning as opposed to deep, intentional systemic change.

Figure 1

Kotter's Eight Steps to Transforming Your Organization (2011, P. 2) Model Guided a Multi-Directional Approach to Change Management



Establishing and Executing on a Horizontal Vision

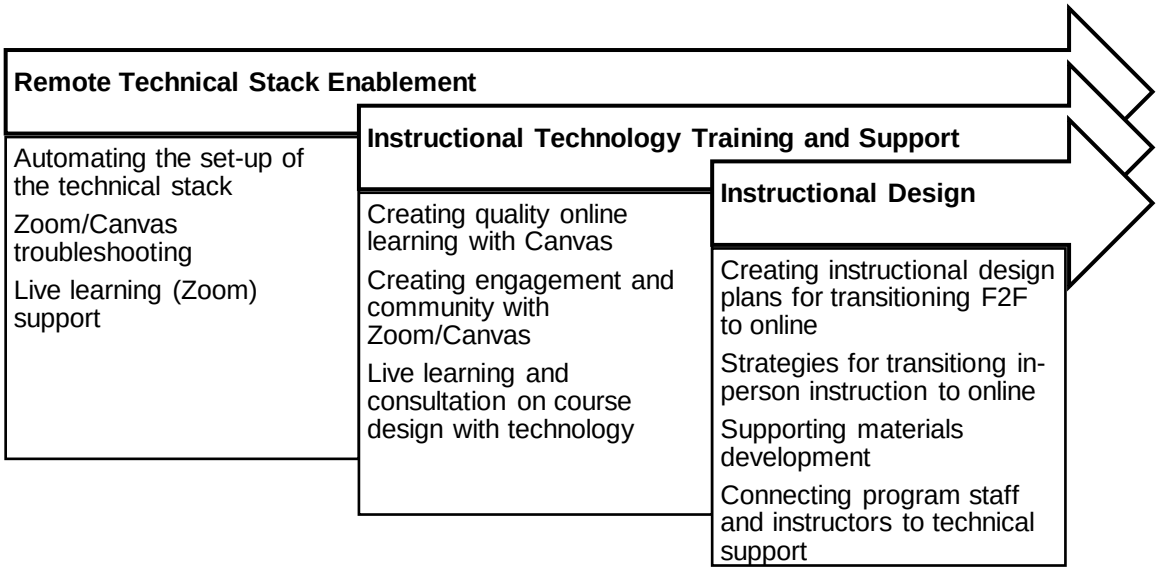
The pandemic itself created the sense of urgency to act, leading to application of the second principle, and arguably most important in a time of crisis, building a guiding coalition. The organizational structure of the CPE necessitated building multi-directional coalitions, both across the academic and operational leadership of the division, and within the COE team. In order to lead the division to provide a high-quality experience to students, the assistant dean committed to supporting the entire division but would need to enlist support horizontally. While the COE team could contribute instructional design and educational technology expertise to facilitate learning, such widespread change would need to better leverage the core systems that were managed in other areas of CPE. With support from internal IT, marketing, and student services, CPE academic leaders committed to training their program teams so that the diverse portfolios of the division could maintain the integrity of instruction. To lead this effort forward, the coalition team consisted of almost 20 people, providing the power and clarity to accelerate the CPE response.

Building and executing on the coalition's vision required disruption within the COE team. As the most influential messenger during a time of change, the direct manager is best positioned to build awareness and help diffuse resistance to change (Hiatt and Creasey, 2012).

At the time of the crisis, the team operated in a hierarchy, led by an executive director, reporting directly to the assistant dean. To produce scalable service, the team would need to flatten and operate in new configurations to meet the varied needs of moving to a horizontal support and enablement model. Within one week, the team understood the vision behind the model proposed and committed to be agile in practice as the magnitude of the situation remained unknown. Each new team functioned with a lead and co-lead to provide resiliency should the pandemic compromise the health of the COE team. Figure 2 represents the first iteration of a horizontal model that would drive longer term change within the COE team.

Figure 2

First-Generation COE Team Emergency Triad Model



Prior to the pandemic, the team operated in a traditional hierarchy, focused on building fully-online courses and supporting the learning management system. The instructional design team spread out to all areas of CPE, managing the relationships on the front lines of the response. The new formation enabled the team to mobilize on multiple fronts, empowering new leaders to capitalize on their skills, offering new services that were needed to move all instruction to an online modality. Prior to March 2020, the COE team did not offer widespread training, just-in-time support, or instructional planning, except for fully-produced online courses. Within two weeks, the new team formation provided professional development that reached 400 instructors and staff, established a just-in-time support solution for students and instructors, and provided 50 in-depth instructional design consultations. The team expedited their work quickly, and their workshops drew attendees from other universities in the region, as there were no offerings at their own campuses.

In part, the COE accomplished a successful reach in such a short time because individuals in the team engaged in a form of sensemaking, a key support strategy to organizational change (Kezar and Eckel, 2002). The smaller, micro-team structures in the COE enabled individual team members to operate in new roles, as the pandemic necessitated a shift in deploying their skills and expertise. They were able to determine the needs of programs and apply support and solutions almost instantaneously. The entire team engaged in informal ongoing professional development, and team members operated in pairs and trios on engagements with program staff, instructors, and students. This provided an opportunity for cross-training, which contributed to a greater understanding of the work of each triad. The assistant dean encouraged all COE team members to attend all workshops and just-in-time training sessions, as time allowed, which would enable them to observe, apply, and diffuse new skills throughout the CPE.

The reconfiguration of the team in these new roles facilitated rapid diffusion and adoption of emergency instructional delivery models. Acting as innovators, the COE team introduced new yet complex concepts of online learning into the organization (Rogers, 2001). By connecting those practical strategies to the diverse portfolio of the CPE, the COE demonstrated the advantage of adopting of online methodologies to address the needs of curriculum and student learning. As the COE team spread their knowledge throughout the division, their accessibility as partners to their colleagues helped allay concerns about remote instruction, leading to broader adoption across the division. The CPE academic leadership and staff responded quickly, understanding the inherent value of providing continuity through technology. The expediency of adopting technology, Zoom in particular, enabled immediate continuity, including the capacity to experiment with large-scale conference delivery.

The swift adoption of Zoom as the standard delivery method for instruction spread rapidly in education early in the pandemic. In part, this particular technology enabled delivery similar to in-person instruction, providing the most acceptable pathway to establish instructional continuity. Technology acceptance, according to Davis (1989), relies on two constructs: perceived usefulness and perceived ease of use. Perceived usefulness is the extent to which a user believes a particular technology will serve them in overall job performance. Perceived ease of use, however, is "the degree to which a person believes that using a particular system would be free of effort" (p. 320). Because academic leaders and program staff of the CPE possessed some level of comfort with Zoom, they easily adopted Zoom and fully synchronous both out of familiarity and necessity. These short-term wins established continuity, but they stalled pedagogical innovation as the emergency response became more permanent (Kotter, 2011).

The lack of a full understanding of security, privacy, and accessibility posed risks to the fledgling instructional continuity, so it was necessary to develop the technological and pedagogical practices in individual academic teams. In an effort to sustain portfolio continuity and academic oversight, smaller teams within the CPE replicated the work of the COE triad model. Program leaders mobilized their staff to provide instructional design and technology support services, implementing varied standards and practices. The assistant dean, who had experience running a central IT division, realized the vulnerability created by decentralizing instructional delivery with technology—unless there was a unit with decades of expertise in this space. More importantly, however, creating redundant services throughout the CPE stifled academic programming as staff were busy supporting remote instruction. Quick wins earned early in the emergency were celebrated, reinforcing the validity and success of the change, but the nature of the pandemic required a longer-term vision and still more change (Hiatt and Creasey, 2012; Kotter 2011). The assistant dean revised the vision of the crisis response that established a more long-term strategy for horizontal central services which would serve academic leaders interested in bringing new online programming to scale.

Organizational Outcomes

The CPE found a successful path forward and settled into remote work and instructional delivery. However, as the pandemic continued, change would continue. Transformation is not an easy road, and organizations falter when they stop innovating and declare victory too soon (Kotter, 2011). In response to the crisis, academic leaders wisely absorbed instructional support, which provided initial programmatic continuity, as they were closest to their instructors and students. As the pandemic continued to keep classrooms closed, the CPE leadership decided to centralize instructional support within the COE team, thus enabling academic staff to continue optimizing and building new programs. Just as the work stabilized in program areas, the assistant dean, in collaboration with academic leaders, worked to transfer the responsibility of organizational instructional support to the COE team.

In about six weeks, the COE team established continuity through widespread training and knowledge enablement, returned to its core divisional function of online course production, and then built a new, centralized instructional support team. The iterative nature of the horizontal expansion aligns with the concept of parallel prototyping (Brown and Kātz, 2009). With the training and ideation provided by the COE early in the pandemic, program teams improved upon an initial support prototype (see Appendix B) by putting it into practice across multiple teams, testing its validity. By centralizing the support expertise into a singular team, the prototype is now a valuable service to the programs that are planning to innovate and scale in

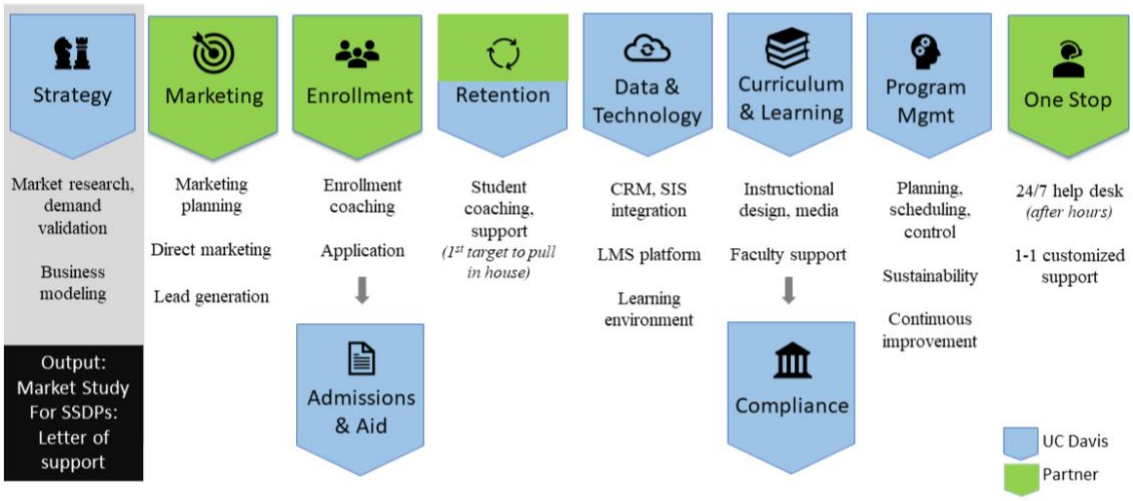
the online space. Continuing to take an iterative approach to change, the assistant dean began to introduce new, scalable models of online learning and delivery to support innovative programming (see Appendix C). By socializing these models in relation to the knowledge learned during emergency remote teaching, the assistant dean built new awareness to support future academic programming. With the experience of the pandemic, academic leaders and program staff embraced more agile methods of course development, beyond synchronous learning facilitated by Zoom.

Post-pandemic Horizon

Like all universities, UC Davis is attempting to balance the present with the future in the face of the unknown. CPE is well-situated to strengthen the university overall, especially self-sustaining graduate degrees, by enabling and accelerating online learning at scale. The week before the pandemic disrupted classroom learning, CPE's Dean presented an online program enablement strategy for graduate and professional schools to the academic leadership of UC Davis, *Figure 3*.

Figure 3

Graphic Depiction of the Proposed Online Graduate Program Enablement Ecosystem



In building this strategy across the university, the Dean, informed by experience, provided a compelling argument for in-sourcing the capability to deliver fully-online learning at scale. The knowledge and expertise of CPE is fundamental for UC Davis to harness the power of both resources and experience and achieve its goal to operate as one university (English,

2013; White, 2013). Recognizing that core institutional competencies of CPE, the university's leadership accepted the proposal.

With the majority of classrooms at UC Davis still closed in Fall 2020, the online graduate program enablement initiative moved into the execution phase. The executive leadership of CPE continues to forge ahead, partnering with the larger university to build a strong foundation for the future. To lead in a time of uncertainty is a necessary competency in CE organizations (Braverman, 2013). The emergency response to instructional disruption offered CPE an opportunity to prototype its new and needed capabilities for larger university online enablement, testing, learning, and improving in practice (Brown and Kātz, 2009). Through quick yet thoughtfully applied change management, the lessons learned in an emergency response provide the integrative thinking needed for CPE to support a more future-oriented, strategic enablement position for its university partners.

Establishing Permanent At-Scale Competency

As a self-sustaining academic unit, CPE possesses years of experience in strategic program development, including business development, market research, and lean program design and management. CPE honed these competencies in service to the "nontraditional" learner (Gast, 2013). Business and administrative expertise is a critical component of a successful partnership between CPE and the university. However, the most important element to a successful partnership model is ensuring the efficacy of learner experience (English, 2013).

According to Remenick (2019), roughly 75% of adult learners are defined as nontraditional. Innovative programming aimed at workforce development, combined with online learning's flexibility, supports students in balancing the diverse roles and responsibilities in their lives. As faculty are a fundamental influence on the student experience, comprehensive, wrap-around support services are critical to an online learner's success.

As a result of emergency remote teaching, CPE deepened its expertise in such service delivery, enhancing its capacity to partner in at-scale online learning enablement. The planning and execution of an emergency response are now becoming a more permanent strategy for UC Davis and its partnership with CPE, Table 1, Appendix A.

Barriers to Sustained Change

The outcomes and continued maturation of the CPE divisional strategy, while positive, experienced setbacks, but CPE continues to find opportunities to learn and improve. The unplanned change to instructional delivery illuminated deeper systemic barriers to adopting online learning more broadly, prior to the disruption of COVID-19. The need to respond to both

short and long-term planning in light of the pandemic did impact the typical mindset people apply to their daily work and actions (Kondakci and Van den Broeck, 2009). By operating in a new cognitive frame, in part facilitated by the experience of working in the online space, the barriers did ultimately move toward solutions.

- **Barrier**: A lack of centralized understanding of the academic planning processes, including an accurate and authoritative source of data, led to gaps in execution that persisted in the early months of the pandemic closure.
- **Solution**: At first, an inability to produce a master list of instruction, appeared to be a simple barrier to overcome. However, the solution led to more comprehensive, long-term planning, through an iterative process of collaboration, training, and execution between teams. An outcome of this barrier is a project and change management initiative to streamline IT applications and institute stronger data governance structure within the division.
- **Barrier**: Funding the newly formed instructional support team proved difficult, especially in contract-based professional development. Financial models to support innovation of the in-person portfolio continues to necessitate refinement.
- **Solution**: Data collected during the university's classroom closure is being used to model the actual cost of at-scale online design and delivery services for a diverse portfolio of instructional types. A particular constraint is structuring contracts to include affordable support service for delivering instruction in the online space. Historically, online design for contract instructional services proved to be cost prohibitive for some areas of CPE. Introducing new models of instruction, Appendix C, aims to offer a spectrum of quality online learning experiences that are both affordable and sustainable.

Conclusion

Overall, the organization's ability to mobilize behind their common values sparked a transformation that strengthened capacity to deliver quality instruction, at a time when emergency instruction jeopardized years of progress toward legitimizing online learning. In building a coalition and leveraging newly formed relationships to facilitate change, both the academic and operational leaders of CPE found themselves working side-by-side to provide access and connection to others at a time when the world, country, and state of California were physically distant. The words used to describe the COVID-19 event and its impact on education – distant, remote, emergency – are not words CPE leveraged to drive decisions, those made under pressure and unprecedented circumstances. With a true focus on continuity, quality, and

the future, CPE defined its work on its own terms, not those borne of a crisis and disruption felt at every institution of learning in the world.

References

Braverman, L. (2013). The dynamic flux of continuing higher education: Redefining the new roles, responsibilities, and expectations. In R. White, & F. DiSilvestro (Eds.). *Continuing education in colleges and universities: Challenges and opportunities* (pp. 7-15). New York, NY: John Wiley & Sons. Retrieved July 28, 2020, from https://ebookcentral.proquest.com

Brown, T., & Kātz, B. (2009). *Change by design: How design thinking transforms organizations and inspires innovation*. New York: Harper Business.

Burke, W. W. (2008). *Organization change: Theory and practice*. Los Angeles: Sage Publications.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319-340. doi:10.2307/249008

English, A. (2013). Partnerships with academic departments. In R. White, & F. DiSilvestro (Eds.). *Continuing education in colleges and universities: Challenges and opportunities* (pp. 27-37). New York, NY: John Wiley & Sons. Retrieved July 28, 2020, from https://ebookcentral.proquest.com

Gast, A. (2013). Current trends in adult degree programs: How public universities respond to the needs of adult learners. In R. White, & F. DiSilvestro (Eds.). *Continuing education in colleges and universities: Challenges and opportunities* (pp. 17-25). New York, NY: John Wiley & Sons. Retrieved July 28, 2020, from https://ebookcentral.proquest.com

Hiatt, J., & Creasey, T. (2012). *Change management: The people side of change.* Loveland, CO: Prosci Learning Center Publications.

Joksimović, S., Poquet, O., Kovanović, V., Dowell, N., Mills, C., Gašević, D., Dawson, S., Graesser, A. C., & Brooks, C. (2018). How Do We Model Learning at Scale? A Systematic Review of Research on MOOCs. *Review of Educational Research, 88*(1), 43–86. https://doi.org/10.3102/0034654317740335

Kezar, A., & Eckel, P. (2002). Examining the institutional transformation process: The importance of sensemaking, interrelated strategies, and balance. *Research in Higher Education*, *43*(3), 295-328.

Kondakci, Y., & Van den Broeck, H. (2009). Institutional imperatives versus emergent dynamics: A case study on continuous change in higher education. *Higher Education*, *58*(4), 439-464.

Kotter, J. (2011). Leading change: Why transformation efforts fail (pp.1-16). *HBR's 10 must reads on change management.* Boston, MA: Harvard Business Review.

Lederman, D. (2020). The state of online education, before Coronavirus. *Inside Higher Education*. Retrieved June 21, 2020, from https://insidehighered.com/news/2020/03/25/survey-gauges-state-online-education-landscape-pre-coronavirus#.XxyjKBD6vzk.link

Moore, G. A. (1991). *Crossing the chasm: Marketing and selling technology products to mainstream customers*. New York, NY: Harper Business.

Pelletier, S. (2019, Spring). Success at scale: The growth of large-scale online programs. *UNBOUND: Reinventing Higher Education.* Retrieved July 30, 2020, from: https://unbound.upcea.edu/leadership-strategy/credentialing/success-at-scale-the-growth-of-large-scale-online-programs/

Remenick, L. (2019). Services and support for nontraditional students in higher education: A historical literature review. *Journal of Adult and Continuing Education*, *25*(1), 113–130. https://doi.org/10.1177/1477971419842880

Rogers, E. M. (2001). Evolution: Diffusion of innovations. In N. J. Baltes & P. B. Smelser (Eds.), *International encyclopedia of the social & behavioral sciences* (pp. 4982-4986). Oxford: Pergamon.

Roll, I., Russell, D., & Gašević, D. (2018). Learning at scale. *International Journal of Artificial Intelligence in Education*. *28*(2), 471–477. https://doi.org/10.1007/s40593-018-0170-7

White, R. (2013). The road ahead: Challenges and opportunities. In R. White, & F. DiSilvestro (Eds.). *Continuing education in colleges and universities: Challenges and opportunities* (pp. 101-105). New York, NY: John Wiley & Sons. Retrieved August 5, 2020, from https://ebookcentral.proquest.com

Appendix A

Change Management Prototype Maturity Model

Change management strategy (Kotter, 2011)	Emergency Response	Horizontal, Strategic Enablement Response

Establishing a sense of urgency	● COVID-19 suspended all in-person instruction
	● Broadcast communications to establish continuity
		● Emergent services centralized with administrative oversight to standardize instructional delivery and service:
		  ● Instructor and student support team
		  ● Broad instructional design for maturing course development

Forming a Powerful Guiding Coalition	● Convened a multidisciplinary planning team from across academic and operational units, totaling 20 stakeholders ● Established new team structure to broaden the reach of instructional design and technology expertise	● CPE academic leadership team formed and collaborated on development of faculty onboarding and training ● Technical strategy team formed, conducted a needs assessment, and developed project plan to strengthen core academic technology stack and establish data governance ● Partnering with School of Nursing to scale emergent services outside CPE in support of graduate program
Creating a Vision	● Formed temporary micro-team structures and accountabilities to deploy service and support to CPE staff, students, and instructors ● Developed baseline instructional support, Appendix B, design standards, Appendix C, to support consistent delivery of instruction	● Created an administrative oversight guide for online learning enablement model (internal and external) ● Socialized guide among academic leadership for building organizational awareness and feedback to present to wider UC Davis audience for online graduate initiative
Communicating a Vision	● Broadcast communications to division ● Regular status and progress updates to planning team ● Sharing outcomes at divisional town halls ● Documentation circulated for both input and knowledge sharing	● Broadcast communications to instructors and students for external support services ● Established need for continuing instructional support team to serve online graduate initiative ● Collecting data to verify future staffing needs (internal and external)

Change Management Prototype Maturity Model (cont'd)

Change management strategy (Kotter, 2011)	Emergency Response	Horizontal, Strategic Enablement Response
Empowering others to act on the vision	● Flattened vertical team structure into a service triad with new tiers of leadership ● Worked with marketing to create broadcast communications and websites to build awareness of service triad	● Facilitated collaboration between instructional design and delivery teams ● Establishing cross-divisional business processes and collaboration to create a technological support system for external delivery of support services for instructors and students – building internal capacity for 24/7 help-desk enablement ● Established project prioritization governance group with CPE academic leaders for internal vetting of online projects
Planning for and creating short-term wins	● Offered mass instructional support training opportunities to internal and external audiences ● Created intranet of information on planning, emergency response, and related support services ● Formed a temporary remote instruction support team	● Enabled public-facing website for instructional support services ● Provided direct outreach to instructors and student to access support services leveraging Salesforce ● Collaborated on model to fund permanent instructional support team
Consolidating improvements and creating still more change	● Moved all instructional support to COE for a 6-month term ● Click here to enter text.Created required instructor onboarding curriculum ● Increased adoption of common technology stack for remote teaching	● Collaborated with external partners to broaden model of faculty development, including securing short-term funding ● Developed foundational CPE instructor development curriculum
Institutionalizing new approaches	● Catalyzed division-wide strategic IT planning and enablement ● Proposed new financial models for facilitating new business models, inclusive of remote learning support costs	● Developed project plan to operationalize core academic technology stack, inclusive of intended user experience for fully online graduate programs ● Established partnership with central IT campus to support systems integration projects ● Established awareness for data governance structure

Appendix B

Instructional Support Team Model

The overall goal of the end-to-end support model is to offer enough proactive support to advance our instructors in developing their skills, enabling them to become more independent and skilled in online delivery. A member of the online instruction support team will be assigned to support each instructional offering. The level of support will depend on factors determined during the delivery plan phase.

	Service Provided	½ Day	1 Day with Break	Multi-Day (Bootcamps/Open Enrollment)
Pre-Instruction	Consultation	1 hour	1 – 2 hours	1 – 2 hours
	Practice Instruction	1 – 2 hours	1 – 2 hours	2+ hours
During Instruction ***[Level of support depends on complexity of delivery model]***	Instructional Facilitation and Technology Support	2 – 3 hours	2 - 3 or 6 - 7 hours	2-3 to 6-7 hours (1-4 days to transition instructor to independence)
	Instructional Technology Support	1 – 2 hours	1-2 hours for each half of the day	2-3 to 6-7 hours (1-4 days to transition instructor to independence)
After Instruction	Evaluation	N/A		
Time Commitment		**3 – 7 hours**	**4 – 13 hours**	**4 – 40 hours**

Instructional Facilitator and Technology Support Role

- Consults with instructor before planned course offering
- Designs an instructional delivery plan with instructor
- Supports instructor in delivery of instruction through facilitating live-discussions, break-out rooms, or discussions
- Provides synchronous session support for instructor to mediate technology
- Troubleshoots technology with instructor or students
- Ensures evaluations are distributed post-instruction

Instructional Technology Support Role

- All of the above, EXCEPT, independently designing an instructional delivery plan. May facilitate an instructional design consultation and work in collaboration to design and support the creation of the instructional delivery plan.

Appendix C

Maturity Model for Instructional Support and Delivery

Instructional Models

To provide high-quality online instruction and advance instructor readiness for continued delivery in this modality, the following instructional models are offered to frame our work with instructors.

Delivery Model	Definition by Instructional Time	Primary Technology	Supplementary Technology
Synchronous	50% or more instruction occurs in live learning sessions	Zoom or Teams	Canvas
Hybrid Online	30 – 50% of instruction occurs in live learning sessions	Zoom or Teams Canvas	Screencast-o-Matic Kaltura
Fully Online	Less than 30% of instruction occurs in live learning sessions	Zoom or Teams Canvas	Screencast-o-Matic Kaltura 360 Rise

Instructional Delivery Model Alignment with Technology

The technology stack can provide instructors a tool set to create engaging, active-learning experiences, with the support of experts in core technology and support. In consultation with a member of the online instruction and support team, instructors and their students are offered skill-building opportunities to prepare for instructional delivery and success in this modality.

Delivery Model	Required	Recommended
Synchronous	• Zoom basics training, either live learning or drop-in practice sessions • Accessibility, privacy, and security training with technology stack	Canvas basics and engagement training
Hybrid Online	• All of the above • Canvas basics and engagement training to learn about the tools available for delivering asynchronous learning	Video-creation training
Fully Online	• All of the above • Video-creation training	Active learning strategies and tools

Louisiana Tech University Today and Sprinting Towards Tomorrow

Donna Johnson[a] and Thomas Hoover[b]

Abstract

As a primarily residential, high research institution, Louisiana Tech University is proud of the creativity and innovation that have been hallmarks of its residential student experience and rich academic environment since its opening in 1894. In March of 2020, all bricks and mortar of the 125-year-old campus lost their vibrancy when the SARS-CV-2 (coronavirus), COVID-19, and the subsequent safety measures caused the campus to alter operations as they knew them. The innovations and improvements implemented to elevate the campus to a new dimension of learning and working- virtual- were exercises in change management with the goal of creating viable solutions for our existing students, faculty, and staff, while preparing to serve larger numbers in the future. What follows is a description of how Louisiana Tech found success and opportunity in some of the most challenging times ever.

Keywords: Pandemic, solutions, infrastructure, scalability, technology

Introduction

Scaling technology capabilities for horizontal and vertical growth is what Louisiana Tech University aimed for when responding to effects of COVID-19 on campus operations. Scaling horizontally meant to strive for unification across all units and departments for campus technology practices, products, and procedures. This unification was geared to ensure efficiency of scale, thereby finding cost savings and continuity of support. Horizontal technology growth was also designed to bring with it the capacity for vertical growth in student enrollment and the continued enhancement of the campus technology infrastructure. To appreciate fully the immense task of implementing technology-rich solutions in the midst of a pandemic, an overview of what Louisiana Tech looked like pre-pandemic is helpful.

As a primarily residential, high research institution, Louisiana Tech University is proud of the creativity and innovation that have been hallmarks of its residential student experience and rich academic environment since its opening in 1894. Patents issued range from areas such as Agriculture to Nanotech. Degrees in the Liberal Arts fields and education are nationally

[a] Louisiana Tech University, donnaj@latech.edu, ORCID: 0000-0002-6519-9116
[b] Louisiana Tech University, thoover@latech.edu, ORCID: 0000-0003-2174-5573

recognized. Strong athletic teams serve as a cornerstone to foster community engagement. *Living with the Lab* and *Living with Cyber* are examples of programs where students are immersed in their respective fields, gaining a solid foundation of deep study during their freshman year. To have a Louisiana Tech college experience is to find a home away from home, a place to study, grow, and thrive.

From residential life to the research labs, students and faculty at Louisiana Tech connect and create through learning environments designed with the student experience in mind, and this learning environment most often includes proximity and presence. Students and faculty can teach, learn, and research in state-of-the-art classrooms and labs on campus. The near $38 million investment in an Integrated Engineering and Science Building for the University's College of Engineering, finished in the fall of 2019, is one such example of the financial investment and resource allocation made in bricks and mortar for this institution.

In March of 2020, the bricks and mortar of the 125-year-old campus lost their vibrancy when the SARS-CV-2 (coronavirus), COVID-19, and the subsequent safety measures caused the campus to alter operations as they knew them. Residence halls and apartments were emptied. Offices were vacated. Ballfields were quiet. Stages were dark. Labs were closed. Only essential personnel were left. The only audible hum of life left on campus was the restless machines that live in the catacombs of the ivory tower– the University computing center in the basement of the 16-story administration building. What COVID-19 did was awaken the sleeping innovation giant within. This chapter tells the story of an institution that scaled horizontally by creating unity and capacity for technology-mediated course delivery amid a global crisis and positioned itself for vertical scaling and continued capacity for growth in enrollment during and after the pandemic.

Lead Up

Pre-COVID-19 was on the minds of campus administration, the need for additional means to support technology on campus had become a pressing priority. After steep disinvestments in higher education in the State of Louisiana, stability in funding renewed in 2018, and such stability provided the opportunity to address long-overdue needs on campus.

The state of Louisiana has seen a drastic cut in the state’s higher education spending between 2009 and 2018. The state funding during that time was cut by nearly 50% at many institutions in the University of Louisiana System (ULS), the System where Louisiana Tech is a member (Regents, 2019). Those cuts have affected ULS schools for the past ten years, and in some cases, ULS institutions are functioning on a fraction of the budgets enjoyed ten years ago.

The dismal state disinvestment numbers for the UL System can be seen in Appendix A. In short, Louisiana Tech saw an over 54% cut in state funding from 2009 to 2017.

To give these numbers additional perspective, it is essential to look at the United States Southern Regional Educational Board (SREB) funding average. The (SREB) national average is $16,741 per Full-Time Equivalent (FTE) and the state of Louisiana average is $13,091 per FTE. That is a difference of $3,650 per FTE. This amount includes state appropriations plus tuition and fees. The neighboring southern states have the following for tuition and fees per FTE: Arkansas $8,467, Alabama $13,830, Mississippi $11,021, Louisiana $9,273 and the SERB average of $9914 (Board of Regents of the State of Louisiana Data Dashboard, 2019). These averages show that except for Arkansas, the state of Louisiana spends considerably less per student than the other neighboring southern states. Lean numbers such as these create strained budgets which often leads to delayed maintenance and stagnation of growth.

Being a casualty of budget constraints, Louisiana Tech University's information technology infrastructure was, and candidly still is, in need of an upgrade. The University operates on a 20-year-old mainframe for the student information system, finance, and human resources. The physical network needs an overhaul, including the network electronics (routers and switches) as well as hardware that comprises the network. Overall, the network barely works. With these pressing needs, the University made a strategic decision to migrate to WorkDay as a solution, and while WorkDay may be coming to save the day, migration will take place over the next four years. There are short-term pains of investing in a costly, labor-intensive, and time-consuming solution such as WorkDay, but the long-term benefits outweigh the immediate growing pains.

Growing pains come in various forms, and, when managing a technology overhaul in a 125-year-old organization, there are more needs than simply overseeing hardware, software, and system updates. Our campus was ready for an infusion of technology into the campus culture. Louisiana Tech has prided itself on the traditional campus environment, classroom learning, and a high-touch, Tech family experience. The use of advanced technology and automated processes in everyday administrative functions was not necessary because processes occurred just as easily with a pleasant walk to whichever office demanded the handwritten documents. Technology usage in all campus processes was not top priority in lean times. This created a campus culture that embraced the face-to-face colloquial visits in and out of the classroom. While these interactions and processes allow the Tech family to stay personally connected, in times like global pandemics, physical proximity is not possible. Thus arose the need for a mindset shift to accompany the technology overhaul.

Not only was the campus in need of a technology system revamp and enhanced technology to enable cutting-edge operations, but we were also in need of a structural revamp. The initiatives which supported online learning and instructional technology for the campus were not budget priorities in the tight budget days, and Global Campus and the Center for Instructional Technology went dormant. It was in January 2020 that the University made a bold move. Amid financially difficult times for higher education in the State of Louisiana and amidst the investment in WorkDay, Louisiana Tech invested in their first-ever Chief Information Officer (CIO). This person was tasked to find innovative and efficient solutions stimulate and create state-of-the-art systems and practices.

The CIO position has a direct reporting line to the President, and the CIO is a member of the University president's executive leadership team. The new CIO embarked on a listening tour where he met with senior University leadership and various stakeholders to get a comprehensive understanding of the opportunities for improving the information technology services for the University. He also met individually with all the information technology staff around campus. What became clear during these meetings was that there were pockets of innovation and immense professional talent sprinkled across campus. However, the IT staff was decentralized across budget units and reporting lines.

As the CIO became more familiar with the inner workings of the University and its IT systems, the realities of virtual education and technology-mediated campus connections magnified by COVID-19 created an unimaginable urgency for embracing change. For some, the crisis was painful. For others, it was a welcome opportunity and challenge for deliberate and sustained focus. For all, it was an exercise in organizational change management, all while dealing with the "new" working environment.

Supporting culture change across organizations presents challenges, but we found that introducing a culture of technology-mediated interactions to a primarily residential institution in the middle of a global pandemic was revolutionary. Some institutions were well situated to capitalize on the COVID crisis to evolve their operational model; Louisiana Tech has used it to revolutionize many campus norms. Countless Zoom meeting sessions, an Incident Response Team, proposals and plans bounced as shared documents, vendor sales pitches, and committees laced with subcommittees were all outlets for innovation to ignite the spark of hope and trust in moving forward with integrating technology into increasing numbers of campus processes. Our CIO and his team worked tirelessly to make good on every promise made, and every task was undertaken with intent and focus across the campus. Out of necessity, the campus began to find solutions and opportunities for our technology-mediated realities.

Technology integration efforts that were once dispersed in pockets across campus became beacons of hope that began to light the path forward.

Horizontal Applications Geared for Vertical Growth

Achieving almost 100% online operations for a campus that previously offered only 7% of courses online was a daunting challenge, and the need to standardize technologies became evident immediately. Across campus, pockets of innovation in technology-mediated course delivery were thriving, but there was little centralized product and practice. With the COVID-19 challenge appearing so abruptly, Louisiana Tech needed to pivot and implement a unified strategy for remote and online delivery of services and course work by capitalizing on existing strengths and filling in gaps with innovative solutions.

Quality Across the Board: Creating the Horizontal Foundation

Accomplishing these goals requires a centralized focus and well-defined strategies to fortify the IT foundations. Primary objectives in the expansion of technology enhancements were to create safe learning environments with high-quality instruction and remote work capabilities without losing functionality. Achieving safe learning environments meant distance teaching and learning for faculty and students, and teleworking for employees meant the implementation of altered processes and work locations.

The technology talent that existed before the pandemic across campus included pockets of innovation and organized efforts to bolster the advanced use of instructional technologies. Within the College of Education, a physical location called the HUB is outfitted with hardware and software to support faculty, staff, and students in that College. The College of Business has state-of-the-art interactive classrooms complete with student display huddle stations and live streaming capabilities. This College also boasts a mock trading room where students learn while sitting in a live-time stock trading ticker display. Pockets of innovation such as these were encouraging signs for growth. These unique and innovative activities provided vivid models for creating new and innovative virtual operations across campus. For a visual comparison of systems and tools in use pre-COVID and those implemented at Louisiana to address the challenges of technology-based operations, see Appendix B.

As part of the campus technology standardization, Zoom was selected as the University's means to offer synchronized (live streaming) course content. It also began to serve as the virtual conference room for meetings. At the same time, MediaSite was picked for asynchronous (pre-recorded) content. Zoom was selected because of the leadership's familiarity with the product and its ability to integrate with instructional technology tools the University already had

in place. As documented in Appendix C, the volume of Zoom meetings held by those using campus-issued license bears testament to its prevalent use for connecting virtually. One of the Colleges had a campus-wide license for MediaSite, so, when the COVID situation impacted campus, the license was opened as a campus-wide resource. Appendix D highlights the increased usage of this tool as an exponential increase from September 2019 through August 2020. The CIO also identified an open-source degree-completion mapping program to adapt to Louisiana Tech's specific needs for curriculum planning and student support. The program gives degree progress tracking capabilities to students and advisors, as well as to potential transfer students so they can map their existing and proposed progress through degree programs at Louisiana Tech.

To find efficiencies in student support, a product for degree completion mapping was brought into usage. This was also a strategic choice related to the leadership's access and knowledge, as he was aware of the opensource nature of the selected tool because of his work with the very team that made it; it is called Flightpath. This gives degree progress tracking capabilities to students and advisors, as well as to potential transfer students, which creates veins for students to map their potential progress should they choose to come to Louisiana Tech.

The University was using Moodle as its learning management system (LMS). While that student-facing technology was meeting most course delivery needs, there was a pressing need to measure how well students responded to course delivery in the new pandemic environments. The University acquired IntelliBoard, which is an LMS data analytic program used to assess student engagement and bolster student success. To help ensure the successes of students were their own successes, Tech purchased Respondus to support the test integrity of online examinations. These selections and integrations were key in finding instructional technology systems that could smoothly integrate with existing systems and assets and to facilitate faculty and student comfort and familiarity.

Faculty Preparation

The faculty, staff, and students at Louisiana Tech are worthy of these technology investments and are also worthy of the University investing in training on how to best use them. To meet expanded training needs, the University of Louisiana System organized efforts around providing professional development to all member institutions, including Louisiana Tech. These trainings, while immensely valuable, were generalized to meet the needs of all nine campuses in the System, which left many Louisiana Tech employees eager for training to meet unique campus needs. The CIO, who made significant contributions to the ULS training initiative,

proposed a campus-specific training solution whereby subject matter experts on campus would be compensated for offering trainings on predetermined topics for faculty, and those who completed training would not only become better trained, but they would also gain monetary and/or evaluation-specific benefits.

Louisiana Tech offered specialized training for faculty in the Summer of 2020 to assist the faculty in using the new technology tools. It was essential to provide training supports to ensure that tools, existing and new, were used to improve the educational experience for students, staff, and faculty. Because of time constraints imposed by the pandemic, Louisiana Tech ensure that the most appropriate and meaningful training sessions were provided. The training sessions offered were chosen based on Spring Quarter survey feedback from the students, faculty, and staff, as well as input gathered by the University's academic leadership. The faculty training courses were centered around the following topics: data analytics, academic integrity, Video/Lecture Capture/Streaming, and an LMS boot camp to ensure instructional readiness. Similar training sessions were offered to faculty in the Spring Quarter, but much of the training was compressed and reactive to the abrupt pivot to remote and online environments.

Feedback from faculty indicated that they would prefer to have early access to next quarter's (Fall 2020) courses in Moodle to allow them extra time to prepare and set up their classes. Faced by the uncertainty in the Summer of a return to traditional modalities in the Fall, Fall 2020 classes were made available in Moodle for faculty members in the middle of July. With these supports and opportunities in place, the technology revolution that was Louisiana Tech's response to a global health crisis was becoming the new toolbox for the entire campus.

Quantity: Building Capacity for Vertical Enrollment

Building the infrastructure of hardware, software, technical support, and culture of technology integration has been the foundation for unifying and focusing students, faculty, and staff at Louisiana Tech And like most, if not all, higher education institutions, we recognize the need to find comfort in the emerging campus technology landscape, and the aim is to do so while enabling ourselves to serve increasing numbers of students.

To serve a larger student population post-COVID means that all existing and newly implemented solutions need to be characterized by scalability, versatility, sustainability, and range. Scalability was a consideration when looking to offer access to systems and support to increasing numbers of individuals. All the purchased and implemented tools were integrated without the restriction of numbers of users, and this removed the ceiling of how tall Louisiana Tech can grow vertically. Versatility was a consideration when selecting tools that could meet the needs of various types of University stakeholders as this broadened the user base.

Sustainability of systems was considered on two axes- fiscal and functional. With no guarantee of additional funds for upgrades nor the opportunity to add personnel for support, choosing solutions that came with durability and user-friendliness is essential. Lastly, the range of who can be reached through new technologies was an important consideration to ensure that we were not only preparing to serve those within our current reach, but we are also increasing the impact of the institution.

Considerations for vertical scalability to enhance enrollment numbers require that the institution embrace distance education and the culture of meeting students where they are, whether they are on campus or remote, even if that means the students are not in the seats of the lecture halls. We are now positioned to take our courses to the students wherever they can connect from, the lecture podiums to the faculty members in their teaching spaces of choice, and our office operations out of the room numbers listed in the campus directory. What's more, the opportunity to bring all the Louisiana Tech family into the digital landscape together creates the shared experience of change—a campus technology revolution.

Post-COVID: Creating New Business Approaches and Models

While the future of higher education in both the near and distant future is still being formulated, debated, and predicted, there are many steps Louisiana Tech is taking to ensure relevance in a post-COVID landscape. We are taking the opportunity to reevaluate current practices, procedures, and programs. A campus team has been convened to explore the developing terrain of education. This team's focus will be on internal workflows and opportunities as well as exploring external advancements and partnerships. There will be many cultural and functional challenges for the campus as we make technology-mediated interactions part of our new norms and attempt to steer our University towards vast opportunities for vertical growth. The tools we use for our work will be different. The industries we seek to prepare students to enter as professionals may look different. Our students and their expectations may be different. We will respond to the challenges.

Data analytics is an area where Louisiana Tech knows that advanced technology can be significantly impactful. Our learning management system and the add-on of Intelliboard will illuminate student success trends in ways that will trigger early intervention for at-risk students. This mechanism alone, if coupled with meaningful interventions, will increase retention, and a student retained is more easily achieved that a student recruited (Barshay & Aslanian, 2020). The more widespread implementation of University learning systems developed during the pandemic will be carried into post-COVID instruction, bringing more opportunity for this type of

data collection, disaggregation, and intervention. In the eventual structure of student support systems, Artificial Intelligence (AI) will likely play a role in predicting student success so that students, faculty, and even advisors and/or tutors can intervene. With after-the-fact data, real-time data, and predictive data, we will be able to formulate creative and responsive ways to bolster student success.

Predictions about the landscape of higher education also include potential changes to the demographic served. One-quarter of incoming first-year students are considering delaying a year, and this delay is being called a gap year (Runcie, 2020). Not only will the flow of incoming freshman potentially be dampened, but the need for non-traditional students to retool and reskill will also likely increase as unemployment, and career shifts are predicted to plague the current workforce (Terralever, 2019). International students may feel forgotten and leave vacant the seats they once occupied in US institutions. Not only will the numbers and demographics of the students we serve shift and change, but perhaps the expectations of those students will look different in the future. It is quite possible that students will begin to question the traditional, in-person requirement of education. The post-pandemic student may also expect a more flexible instructional modality than bricks and mortar operations offer.

Conclusion

The COVID-19 Pandemic has had an enormous impact on the way that practically every aspect of life since March 2020, and no one can really tell when that impact will end. It is important to note that the responses that have been made to the pandemic are more than hasty reactions, they should be framed as expedited advances and improvements in the way that the university operates. The pandemic happened to be the cause that allowed the university to make these advances and investments that will provide long-term dividends. Apocalyptic predictions of big tech merging with big name institutions vs. a complete return to the way things were pre-COVID are the two ends of the spectrum. But at Louisiana Tech, the innovations and improvements made during the pandemic have been executed in a way that highlights pathways to sustainability regardless of the circumstances that arise after the pandemic. What has occurred in the last six months is change could not have predicted or imagined for higher education. As long as we manage the change well and aim our goals at the positive human experience of shared interactions of learning, we will remain relevant, and the campus technology revolution will frame a bright future for Louisiana Tech.

References

Barshay, J., & Aslanian, S. (2020). *Predictive analytics are boosting college graduation rates, but do they also invade privacy and reinforce racial inequities?* Retrieved August 07, 2020, from https://hechingerreport.org/predictive-analytics-boosting-college-graduation-rates-also-invade-privacy-and-reinforce-racial-inequities/

Board of Regents of the State of Louisiana Data Dashboard. (2019). Retrieved July 17, 2020, from https://masterplan.regents.la.gov/home/data/data-dashboard/.

Runcie, A. (2020). *Incoming college freshmen might delay school due to COVID-19.* Retrieved July 17, 2020, from https://www.cbsnews.com/news/coronavirus-incoming-college-freshmen-might-delay-school-due-to-covid-19/.

Terralever, L. (2019). *Marketing higher education to today's non-traditional students: Understanding their motivations and barriers*. Retrieved July 17, 2020, from https://www.laneterralever.com/hubfs/Marketing-Higher-Education-to-Non-Traditional-Students-(White-Paper-Nov-2019-Updated).pdf?hsLang=en

Appendix A

University of Louisiana System (ULS) State Provided Funding Decreases 2009-2017

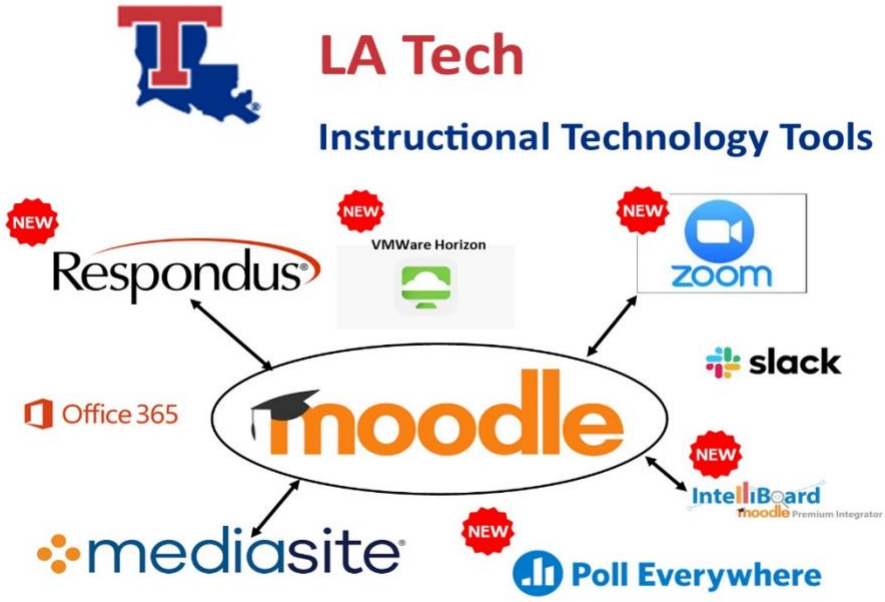
ULS Institution	State Funding per Student 2009 in dollars ($)	State Funding Per Student 2017 in dollars ($)	Percentage Change
Grambling State University	5968	2861	52.1%
Louisiana Tech University	6750	2873	57.4%
McNeese State University	5877	2947	49.9%
Nicholls State University	4323	2767	36%
Northwestern University	7666	2572	66.4%
Southeastern University	9812	2605	73.4%
University of Louisiana Lafayette	6264	3238	49.3%
University of Louisiana Monroe	6954	3327	52.2%
University of New Orleans	7526	4592	39%

https://masterplan.regents.la.gov/home/data/data-dashboard/

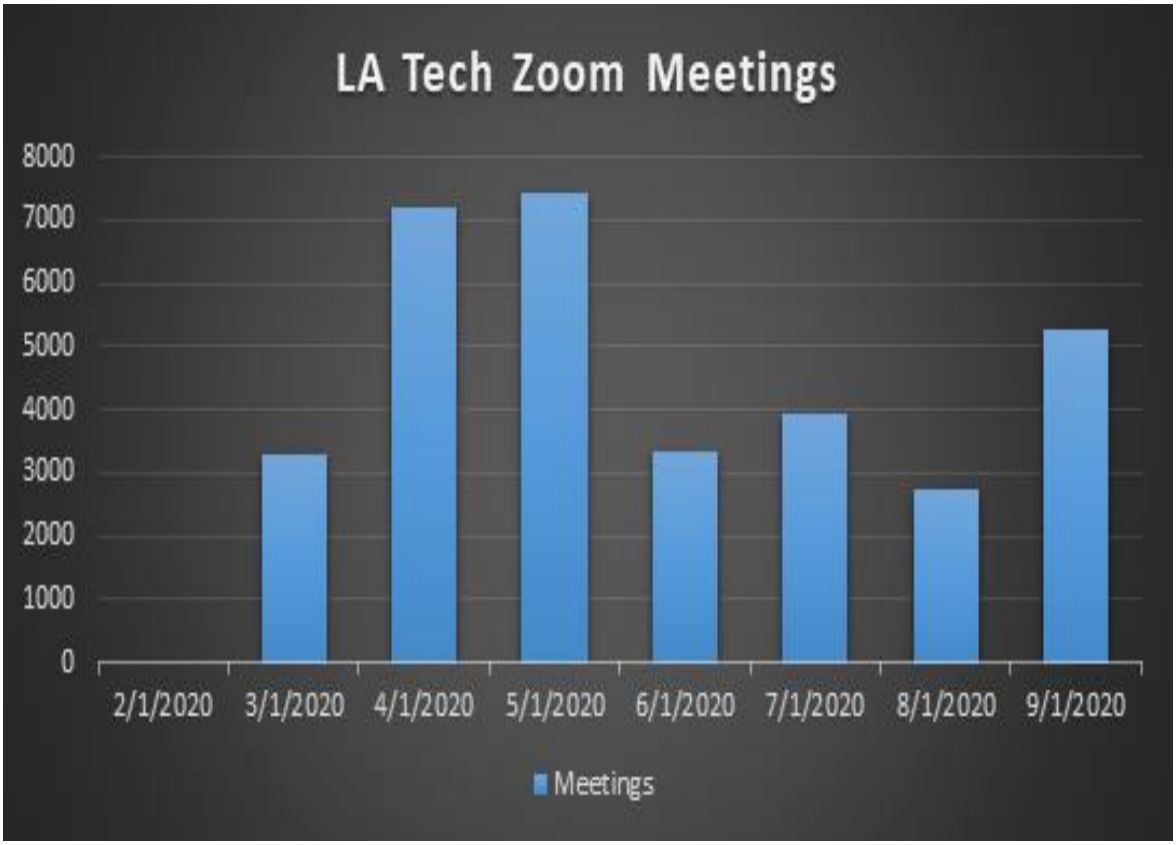
Appendix B

Before March 13, 2020

After March 17, 2020



Appendix C



Campus license was purchased in March 2020, with usage increasing through spring quarter (March-May), leveling off for summer (June-Aug), and increasing again for fall quarter (Sept).

Appendix D

MediaSite Usage Increase Sept 2019- Aug 2020

Result Summary

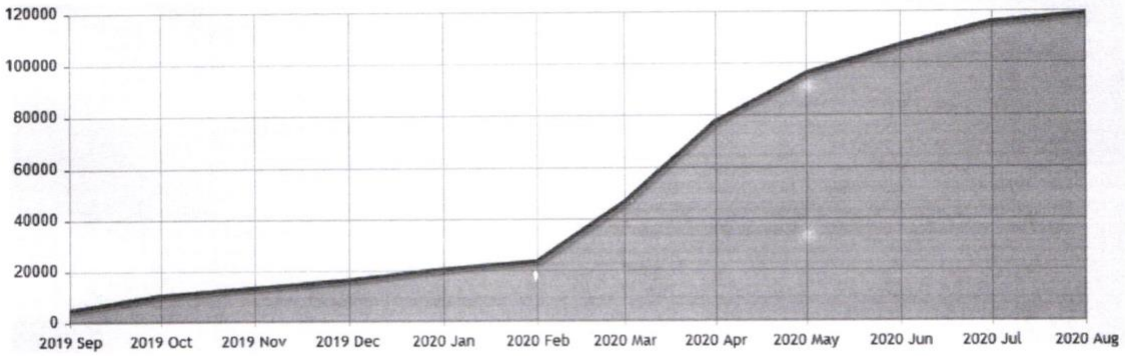
Total Views: 118821

Views:	13 Live | 118808 On-Demand
Watched:	3280 of 10809 Presentations
Time:	30813:14:16 Total Watched (h:mm:ss)
Peak:	64 Connections
Clients:	4714 Users | 12272 IP Addresses | 15 Referrers
Authored:	0 Live Broadcasts | 5 Schedule Recorded

Date Activity | Presentations | Users | IP Addresses | Referrers | Platforms | Sources

Show ▾ By ▾

Viewing Growth by Month



SECTION III

Fostering a Culture of Innovation

Fostering a Culture of Academic Innovation in a Time of Crisis

MJ Bishop[a], Nancy O'Neill[b], and Paul Walsh[c]

Abstract

COVID-19 has thrust much of higher education into a liminal space, where norms and conventional wisdom no longer operate as they once did. While recognizing the devastating societal effects wrought by the pandemic, viewing higher education's ongoing response in this way invites us to consider how we can embrace this moment as an opportunity for transformational change. This chapter addresses how institutions can leverage the massive and sudden move to remote teaching sparked by COVID-19 to foster a culture of academic innovation. It highlights one university system's efforts to help a diverse, decentralized, and differentially resourced set of institutions pivot from a crisis response to robust, technology-enhanced teaching and learning that is sustained past the crisis period.

Keywords: Academic innovation, change management, crisis, organizational culture, university system

Introduction

COVID-19 has thrust much of higher education into a disorienting liminal space, where norms and conventional wisdom no longer operate as they once did, and many are yearning for the time when things "just get back to normal." While recognizing the devastating societal effects and deep challenges wrought by the pandemic, viewing higher education's ongoing response to COVID-19 as the initial stage of a transitional process invites us to consider how we can embrace this moment as an opportunity to explore academic innovations that promise to improve student success. What would it mean for higher education institutions to pivot from crisis response—in the form of emergency remote teaching—to something much more transformative? And how might a system-level center for academic innovation help to make that happen?

A System-level Center for Academic Innovation

The University System of Maryland (USM) includes 12 of the state's 14 four-year public universities as well as three regional centers that expand access to high-demand degree programs across the state. USM is decentralized. It is a federated system, as opposed to flagship driven, and includes research-intensive and comprehensive institutions, historically

[a] University System of Maryland, mjbishop@usmd.edu, ORCID: 0000-0002-6085-4804
[b] University System of Maryland, noneill@usmd.edu, ORCID: 0000-0002-3664-8445
[c] University System of Maryland, pwalsh@usmd.edu, ORCID: 0000-0001-9181-3848

black universities, specialty graduate institutions, a degree-granting environmental research center, and a fully online institution. The system universities are diverse in mission, academic offerings, and student populations and differentially resourced.

In 2013, the USM Board of Regents established the Center for Innovation and Excellence in Learning and Teaching, signaling a new role for the system as a focal point for catalyzing new ways of thinking about student success, translating ideas into action, and scaling and sustaining promising practices. Renamed in 2015 in recognition of former Chancellor William E. "Brit" Kirwan's commitment to access, affordability, and achievement of high-quality credentials for Maryland students, the Kirwan Center for Academic Innovation (hereafter, the Kirwan Center) has been creating a culture of academic innovation aimed at addressing practical problems by leveraging the affordances of technology and our collaborative strengths—our "systemness" (Zimpher, 2012).

Innovating to Address Practical Problems

The Kirwan Center's activities are guided by thoughtful experimentation, grounded in the problems we're trying to solve, not in rushing to adopt the next new digital device or "best practice" simply for the sake of being innovative. We believe that that "innovation" involves seeing the world in a different way and challenging assumptions. Unlike "change," which tinkers within an existing structure and view of the world, innovation involves new ways of doing things, questioning values and goals, and likely making structural change in current processes and systems. This level of transformation requires a human-centered perspective, a diverse team, experimentation and iteration, a willingness to learn even while failing, and the investment of time and resources.

Leveraging the Affordances of Technology

We believe that "innovation" and "technology" are not the same thing. Technology can be used to implement innovation—and sometimes even inspire innovation—but the technology itself doesn't produce innovation. As seen repeatedly over the history of technology use in education, when "teaching with technology" involves simply inserting some new device into the mix without first understanding how to capitalize on its affordances in the solution of an educational problem, we will never realize the promise of technology to support meaningful transformation. We think about technologies, therefore, in terms of their affordances—the actions they make possible. We believe the most promising affordances of emerging educational technologies are those that help us to be:

- learning centered: makes learning visible and easily communicated;

- data informed: identifies where the problems are and whether our interventions are making a difference; and
- continuously improving: facilitates adaptation when we have identified problems.

The initiatives supported out of the Kirwan Center are focused on the application of these three categories of affordances in the solution of practical problems faced by higher education today.

Advancing Systemness

We believe there are things that higher education institutions can accomplish by working together that would be more difficult or even impossible to accomplish independently. Central to our work, therefore, is building connections across USM institutions and leveraging our collaborative strengths—our systemness—to accelerate and streamline the sharing of promising practices. The Kirwan Center organizes cross-institutional collaborative projects, resource sharing, affinity group networking, and capacity-building across USM institutions and increasingly, statewide. Within each USM institution and regional center, one or more individuals have been tasked with overseeing academic innovation as part of their portfolios. These individuals comprise the Kirwan Center's Academic Transformation Advisory Council (ATAC), which has been meeting once a month since Fall 2013. We also regularly convene teaching and learning center directors, instructional designers and technologists, and project teams from across the institutions. These existing networks provided the launch pad for a coordinated response to the massive move to emergency remote teaching brought on by COVID-19 in Spring 2020.

Coordinated Support for the USM Response to COVID-19

By Friday the 13th of March 2020, the day before Spring Break began, all of the USM institutions had announced their students would not return to campus after the break and classes would be taught remotely for the foreseeable future. This disruption presented an opportunity for USM leadership to tap into our systemness to support each other through the crisis and ensure academic continuity for our students. Within the broader response, the Kirwan Center was charged with supporting the institutions as they shifted to emergency remote teaching.

Supporting the Shift to Emergency Remote Teaching During Spring 2020

From March until May 2020, the Kirwan Center consolidated its existing networks to facilitate communication among institutional leaders involved in the sudden shift to remote teaching—ATAC, centers for teaching and learning, and instructional design units. This "all-hands-on-deck" approach was further strengthened by including representatives from

Maryland's two independent public four-year institutions, Morgan State University and St. Mary's College of Maryland. We convened this newly constituted group, ATAC "Plus" (ATAC+), using existing standing meetings that allowed us to maximize participation while minimizing the impact on people's time.

We began by discussing where the institutions stood on a variety of immediate issues, including equity concerns related to remote access/connectivity as well as communication plans for faculty, staff, and students. This was followed by a survey-based needs assessment to identify and prioritize supports. As professional development materials from Quality Matters, the Online Learning Consortium, and other organizations became available, the Kirwan Center developed a web-based list of resources as well as links to the internally focused sites that institutions were creating. This site was continually revised to respond to the institutions as their needs evolved week to week. When ATAC+ members expressed their interest in surveying faculty, students, and staff about their COVID-19 experiences, the Kirwan Center staff compiled local and national surveys, including instruments from HEDS and Ithaka S+R.

"Supporting the supporters" became shorthand for the Kirwan Center's work with our institutional counterparts who were directly supporting faculty. Based on our needs analysis, this support evolved into a series of capacity-building topical meetings that focused on helping colleagues engage faculty in topics such as authentic assessments, digital accessibility, and high-impact practices in online courses. A number of these topical meetings spun out subsequent activity. For example, as privacy issues with webinar platforms and proctoring became a concern, we worked with the Maryland Office of the Attorney General and accessibility experts at our institutions to create a "best practices" guide on balancing issues of privacy and accessibility. This was shared with the ATAC+ group as well as with the institutions' provosts. Similarly, our discussion about students' readiness to learn in the fall after a difficult spring semester resulted in a working group that created a guide with simple activities to gauge students' prerequisite knowledge, motivation, and feelings so faculty might adjust instruction to address gaps/difficulties. These resources were well received by our counterparts at the institutions and widely distributed.

By the middle of April, it was becoming evident that COVID-19 would be impacting our institutions, at least to some degree, through the rest of the calendar year. So, with the immediate need to support academic continuity for the Spring 2020 semester covered to the extent possible, we began shifting our attention to Fall 2020.

Partnering to Support More Robust Online Education for Fall 2020

Among the USM institutions, we are fortunate to include the University of Maryland Global Campus (UMGC), our open-access, online institution. While UMGC has always been a significant contributor to the Kirwan Center's system-wide conversations around academic innovation, senior leaders across our institutions began turning to UMGC for guidance and support more than ever as they made the overnight pivot to "emergency remote teaching." By April, it was clear that a more coordinated effort was needed to support the campuses through a closer partnership between UMGC and the Kirwan Center. The "USM *OnTrack*" initiative, led by the Kirwan Center and funded through a $2.6M grant from UMGC made possible from CARES Act funding, has capitalized on UMGC's expertise and the Kirwan Center's existing network of colleagues, stakeholders, and trusted partners in order to coordinate system-level support for optimally effective learning—be it online, face-to-face, or some combination of both.

Over the summer, USM *OnTrack* provided immediate support for the Fall 2020 semester, with special attention to ensuring quality in the online teaching and learning experience. We determined that addressing this need would be best accomplished by leveraging our existing capacity for online instruction at UMGC as well as by sharing resources, providing faculty/staff professional development, and increasing learning design and instructional technology capacity. This translated into four major components of work (see Table 1).

Table 1

Major Components of USM OnTrack (Summer 2020)

***OnTrack* Component**	**Hallmarks**
Professional Development Workshops	Purchased a pool of interactive, facilitated online teaching workshops from a training provider. Prepaid workshops were made available generally or allocated to institutions so they could then decide within their local context which topics to offer faculty.
Technology Solutions for High-enrollment and Lab-based Courses	Contracted with adaptive courseware and virtual lab simulation providers to provide up-front training and support throughout the semester both for incorporating the tools into pedagogy and for use of the platform and learning analytics dashboards.
"Do-it-Yourself" Instructional Design Support Services	Contracted with a provider to retain 750 hours of instructional design support for each institution that their teaching and learning centers and/or instructional design units could use as needed. The provider worked with the institutions to make available a series of instructional resources for faculty on best practices for online pedagogy as well as student orientation materials for online learning.
"Ready-to-Adopt" Online Courses from UMGC	Created a process for USM institutions to identify candidate courses to temporarily adopt from UMGC catalog for delivery to their students. Institutions had option to have either UMGC faculty or their own faculty teach these courses. Students register at the host institution as usual, while details on tuition reconciliation, assignment of credit, etc., would be implemented by back-office operations rather than transfer of credit.

The USM *OnTrack* offerings were embraced by a significant number of faculty across USM who engaged in fall semester preparation throughout the summer, even while off contract. In terms of professional development, in a span of seven weeks over the summer, nearly 300 faculty from across the 11 institutions participated in 57 workshops, with a total of more than 1,100 unique registrations. Faculty from a number of institutions emerged as "super users"—10 individuals completed ten or more workshops and 86 individuals completed three or more workshops. More than 400 faculty expressed interest in learning more about adaptive courseware to support their high-enrollment online classes. The virtual reality lab simulations generated enough interest within a few weeks that we upgraded to a system-wide site license, which then enabled costs to be absorbed by Kirwan Center funds rather than passed on to students in the form of a lab fee. Removing this cost barrier for students, in turn, generated significant additional interest on the part of faculty, especially those at institutions with high populations of Pell Grant recipients. Overall, prior to the start of the fall semester, more than 200 faculty inquired about the use of these virtual simulations for their labs, with 72 course adoptions for the fall semester impacting over 1500 students to date.

Nine of the USM institutions availed themselves of the 750 hours of additional instructional design support offered to each campus. Individual use cases attest to the varied ways in which uptake has occurred, which we anticipated going into the process. For example, this "expanded bench" of instructional designers reviewed LMS course sites and settings and offered feedback to instructors; helped instructors to complete course reviews using a design matrix to align activities with learning objectives; helped instructors to transition face-to-face courses to fully online as well as hybrid formats, and consulted with faculty as they began teaching in these new modalities. Additionally, faculty hubs, student "quick start" modules, and LMS course template development was well received by the participating institutions. By the start of the fall semester, a total of 238 hours were used and 61 support tickets were generated. While this usage is lower than we had hoped, we expect requests to pick up as faculty get into the fall semester.

Of the services that USM *OnTrack* made available over the summer months, the least popular option turned out to be the "ready-to-adopt" courses offered by UMGC. Only one of the USM's nine candidate institutions explored the opportunity further and, in the end, advised only a handful of students to register independently for UMGC courses utilizing existing interinstitutional registration processes, rather than to explore a larger MOU arrangement. Kirwan Center staff inquired with institutional points of contact about what made this a less-than-attractive option. While some of the institutions simply decided that this alternative was not

needed, others noted faculty concerns about the applicability/quality of courses coming from an "online institution," difficulties with coordination across units (such as the registrar's office), as well as concerns that this would open the door to ongoing competition from UMGC.

That said, overall the USM *OnTrack* initiative has been well received—particularly by our less well-resourced institutions—and will continue through the Fall and into the Spring 2021 semester to find ways to support the USM institutions as they manage the fallout from the global pandemic. But even as we have been working to overcome the immediate challenges, the need for more transformational change has become clear.

A New Role for Academic Innovation

Tragically, events in the first half of 2020 sparked a renewed urgency to address structural racism across our institutions and surfaced just how much work remains to increase access, affordability, and achievement for all students who seek a postsecondary education. But, while the crisis certainly produced losses and hardships, there appears to be a new openness to embracing innovative solutions to the problems higher education faces moving forward (Burnett, 1998). Yet the question remains: How do we capitalize on that momentum to drive deeper culture change related to improved educational experiences for all students?

The Role of Culture in Innovation

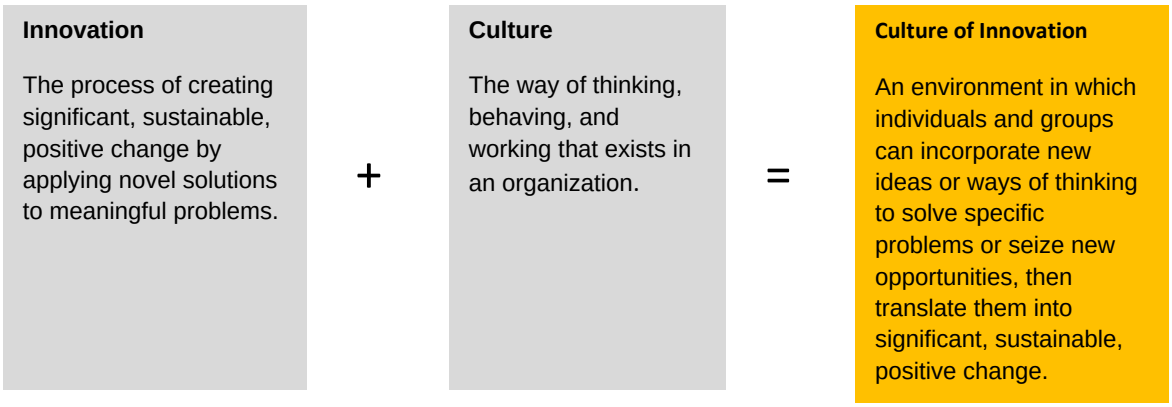
As described, above, we view *innovation* as something much more transformative than just making a few adjustments to pedagogy or introducing a new technology into the classroom. Innovation is, instead, the process of creating significant, sustainable, positive change by applying novel solutions to meaningful problems (Eckel, Hill, & Green, 1998). We've all seen pockets of innovation on our campuses… pilot projects, often led by a "champion," that yield some success but aren't easily reincorporated into the daily operations of the institution and then fade away after the champion leaves or the funding dries up. The issue is that, while the pilot may have generated some temporary, localized changes, the innovation has not fundamentally altered the *culture*—the way of thinking, behaving, and working that exists within the organization.

According to Setser and Morris (2015), "culture is the water your organization swims in"; culture is both the organization's policies and practices as well as the "habits, values, and mindset" of the people who make up that organization (p. 7). When combined, the *culture of innovation* we are striving to achieve is a hospitable environment in which individuals and groups can incorporate new ways of thinking in the service of solving specific problems, or seize new opportunities and then translate them into significant, sustainable, positive change (see

Figure 1, below). Each innovative action, in turn, reinforces the environment for future innovation.

Figure 1

A Culture of Innovation. Adapted from Setser and Morris (2015), p. 8.



With respect to *academic innovation*, the problems we're trying to solve are specific to increasing student success through initiatives that remove barriers to access, affordability, and achievement of high-quality degrees for our students. Stated differently, meaningful and lasting change from academic innovation cannot be achieved simply by scaling educational technology implementations. True transformation in higher education can only come from a change in culture (Kezar & Eckel, 2002a, 2002b).

Creating a Culture of Academic Innovation

Just prior to COVID-19 becoming a global pandemic, the Kirwan Center concluded a year-long process to develop our 2020-2025 plan. While our work continues to be squarely focused on collaborative efforts to increase access, affordability, and achievement, this new plan acknowledges for the first time that accomplishing our mission will require "creating a collaborative culture of academic innovation that catalyzes new ways of thinking about student success, translates ideas into action, and scales and sustains promising practices" (Kirwan Center, n.d., para. 4). To achieve this culture change, the Kirwan Center's new, three-part goal is to: 1) develop statewide academic innovation initiatives that both leverage our systemness and allow key stakeholders to see themselves in the work; 2) build institutional capacity to scale and sustain transformative academic innovation models; and 3) reconceptualize the role of academic innovation from peripheral activity to mission critical for student success.

Helping Key Stakeholders to See Themselves in the Work

Reimagination and transformation of teaching and learning can only happen when others see themselves in the work, can meaningfully shape its direction, and are positioned to

sustain the efforts. We have come to realize that our job is to help the institutional stakeholders come to their own conclusions about the need to frame student success in terms of problems of practice (versus a problem of students) and to approach problems differently by exploring data, options, and available strategies.

We sometimes jokingly refer to this approach as "hiding the broccoli in the mashed potatoes," given the fact that we frequently design opportunities for important insights or new learnings to occur as an objective of our initiatives. For example, we've been known to use conversations about open educational resource (OER) adoptions as an opportunity to work with faculty on developing learning objectives and aligned assessments or make a systemwide inventory of "closing the achievement gap" initiatives a springboard for discussions around being more thorough about collecting data to know what's working and what's not. As we work to build a culture of academic innovation, the Kirwan Center will continue to empower institutional leaders to implement academic innovation in ways that resonate with their local contexts. We will support this transformation by providing guidance and resources for adopting, implementing, evaluating, and sustaining changes in policy and practice.

Focusing on Transformational Academic Innovation Models

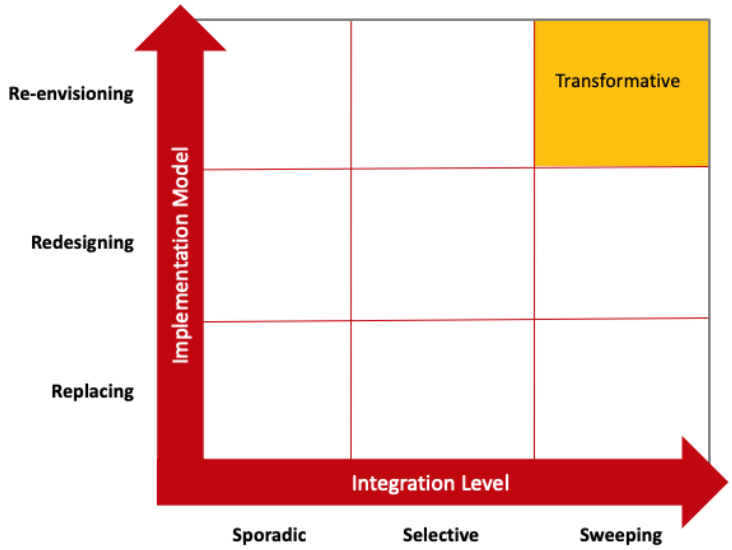
To be truly transformational, academic innovation requires more than just sheer numbers of faculty and student participants in the initiative. Instead, as Coburn (2003) has suggested, scaling an innovation should be predicated on other, less quantifiable factors including depth, sustainability, spread, and shift in ownership of the need for change. Stated differently, to be "at scale," reforms must affect deep and consequential change in practice—measured qualitatively as well as quantitatively. According to Coburn, this means digging below surface measures of implementation to capture a more nuanced understanding of how the innovation is impacting changes to beliefs, norms, and pedagogical principles as enacted in practice. It means exploring institutional organization and structures to understand how existing business models, policies, and environments are impeding or supporting transformation. It involves watching for the spread of innovation both across institutions as well as within an institution. And, perhaps most importantly, to be at scale the reform must finally become self-generative through a shift in ownership of the innovation from the external driver (such as the funder, state agency, or a system office) to the institutional stakeholders.

As illustrated in Figure 2, below, we have begun framing our innovation work by exploring what "scale" looks like in terms of the quantitative piece or the *integration level* (x-axis) juxtaposed against how we are qualitatively engaging with the new tool, system, or process or the *implementation model* (y-axis). Truly transformative scale involves both high levels of

integration as well as optimally effective implementation that capitalizes on the affordances of the technology to optimize student success.

Figure 2

A Framework for Thinking About "Scale" of Academic Innovations.



For example, with respect to our work leading the Maryland Open Source Textbook (M.O.S.T.) initiative to support faculty adoptions of OER, we've seen integration slowly advance from a few interested faculty (sporadic) to targeted programs (selective) and, at least in the case of UMGC, to institution-wide adoption (sweeping). However, as we have explored the nature of many of these OER adoptions, we have discovered that a large majority of the implementations have been only at the level of replacing the existing textbook with OER. Using this framework, we have begun making a much more concerted push toward helping faculty adopting OER to think beyond merely swapping out their textbook toward teaching differently with OER (redesigning) and even exploring how the fact these materials are openly licensed allows for continuous improvement of instructional materials (re-envisioning). Similarly, we hope to guide institutions' recent implementation of online instruction up the y-axis from simply moving traditional courses online to support academic continuity in Spring 2020 (replacing) toward more effective online education (redesigning) and, eventually, a willingness to explore new pedagogical and curricular modules such as modular, competency-based, and stackable approaches (re-envisioning).

Moving from Peripheral to "Mission Critical"

While the Kirwan Center's existing networks have worked well for supporting initiatives and disseminating best practices, we need to begin working more directly with senior leaders at our institutions to help them understand the critical role academic innovation will play in the success of their institutions and their students. When the Kirwan Center was established in 2013, many institutions across the country were exploring organizational changes intended to advance student success through improved teaching and learning and other academic innovation. It appeared we were seeing a shift in thinking about the role academic affairs could and should play in institutional efforts to increase effectiveness and affordability, particularly in relation to student success. Further, those efforts were taking on a highly collaborative tone, bridging traditional higher education silos and—in some cases—even bringing multiple units together under one "umbrella" position (Bishop & Keehn, 2014).

Fast-forward five years, however, and we're discovering this work is hard, takes time, and is not just about inserting technologies and hoping something will stick. Budgets were being slashed, which resulted in already under-resourced academic innovation offices either being cut, not growing, or relying heavily on externally funded projects. And, while faculty are key in helping advance this work, they have not always been entirely aware of the pressures on the institution to change, and the academic innovation leaders were often not in a position to influence faculty thinking (Bishop, 2018). Instead of being viewed as "mission critical," by Fall of 2019 these academic innovation units were increasingly viewed as "nice to haves," "peripheral," and/or "expendable."

This contrasts with the 15 to 25 percent of revenue that other major industries—such as the automobile, computing/electronics, and healthcare industries—spend annually on research and development as part of continuous quality improvement and investment in future capabilities. These organizations know that innovation is crucial to their growth and survival in a competitive marketplace. Like these other industries, higher education also needs to make a similar investment of resources and commitment to innovating to address the economic, demographic, and political pressures coming from its external environment. The potential for more disruption looms on the horizon. Acting in ways that maintain the status quo appears to be riskier than taking bigger chances on the innovation units many of our institutions have already stood up.

In these ways, the Kirwan Center's new plan reflects some fairly significant shifts based on lessons learned from the last seven years of leading academic innovation across a diverse,

federated higher education system. The need for these changes in our approach has only been further substantiated by our experiences so far in 2020.

Key Takeaways from Our 2020 Experiences So Far

COVID-19 is more than a public health crisis. The pandemic and its aftermath are likely to have significant impact on people's behavior on a variety of fronts, including how they access educational opportunities. It also amplifies larger calls for economic parity, social justice, and governmental reform. Here, we offer some key takeaways from our experiences while acknowledging that, as of this writing, this work is still in progress. As such, we also offer a candid assessment on areas that we recognize need to be improved.

Take stock and share what has already changed. When faced with the practical problem of campuses closing, higher education faculty all over the world capitalized on the affordances of online communications tools to maintain academic continuity. We've already demonstrated we can innovate and there are many successes among the stories about our shift to emergency remote teaching—like the science professor at one of our historically black universities whose students' actually did *better* this spring than they had in recent years. Collecting and sharing empirical data as part of open and objective conversations about what has already changed can create those "ah-ha" moments necessary to help your institutional stakeholders come to their own conclusions about the need to innovate.

Consider how the "post-pandemic" is being framed. In many ways, and for many of our students, the "pre-pandemic" context was not working optimally. Consider whether the rhetoric being used to talk about the future—as a "return to normal," for example—helps or hinders academic innovation toward important goals. This insight came from the USM Chancellor, Dr. Jay Perman, who realized mid-summer that referring to fall preparations as our "return to campus" wrongly conveyed certain expectations that could discourage more innovative thinking about our best path forward.

Lead with the practical problems you're trying to solve, not the technologies. Despite the fact this is a central tenet of the Kirwan Center, in the rush of this summer we found it was easy to slip into sending mass emails about joining an "adopting adaptive courseware summit," for example, rather than to frame the invitation around the problems faculty might be facing keeping up and/or making the online learning experience more interactive for their students. In fact, we suspect simply communicating there is available "instructional design support" for faculty might be part of the issue with the low usage of instructional design hours to date. We are currently re-messaging the availability of those services to lead with the educational problems faculty are facing that this support can help to solve.

Determine what is broccoli, and what is mashed potatoes. Some of the problems we're trying to address can be difficult or contentious topics—redesigning courses with high failure rates, addressing structural racism, or scaling faculty professional development, to name a few. As system leaders, we often provide "cover" to our institutional counterparts by embedding activities that tackle these issues within a shared, collaborative project that generates interest and excitement. Likewise, senior institutional leaders can provide this kind of cover to deans and department chairs or cross-departmental academic committees, such as a general education council, a faculty technology council, or a faculty group focused on the use of open educational resources.

Provide a "safe space" for failing and reflecting on lessons learned. Fear of failure is one of the main adversaries of innovation. But now, more than ever, we can't be afraid of trying to improve. Fostering a culture of academic innovation requires that our leaders make clear from the start that it's okay to fail as long as we capitalize on that as an opportunity to learn from our mistakes—essentially embracing uncertainty and liminal spaces as opportunities to unmoor people from day-to-day routines in ways that can allow for new and novel thinking and action to emerge.

Negotiate the "hand off" for successes from the start. In the same way we need to manage the failure of risky new ideas, we also need to prepare for our successes. As discussed earlier, many successful innovations die on the vine because there was never a discussion about how to move them from pilot to mainstream adoption within the institution. Address this from the start of a project by making clear, in writing, the definition of success and how adoption of the innovation will be supported in terms of resources, time, and ownership if successful.

Develop a holistic evaluation framework and assess along the way. As the Kirwan Center looks toward ensuring sustainability of academic innovation, we will need metrics to measure the climate for innovation periodically so we can chart changes in the environment and adjust as needed. Establishing and implementing evaluation protocols will be critical both to determining the long-term impact of our initiatives and to demonstrating the return on our investments for future funding requests.

Concluding Thoughts

While the Kirwan Center has generated a great deal of momentum around academic innovation within the USM—particularly in the wake of COVID-19—there is still much left to do. We have learned that change takes time and is often contingent on garnering additional and sustained support, which state higher education systems are often in a unique position to request from the state or other potential funders. But we have also discovered that by fostering

a culture of academic innovation, the Kirwan Center can play a key role in creating lasting and meaningful transformation through active leadership, initiatives, and strategies aimed at student success.

Acknowledgments

The authors would like to thank Annika Many and Rohit Tandon of edBridge Partners, LLC, for their organizational support of the Kirwan Center, and Rohit for his work on an early version of this manuscript.

References

Bishop, M. J. (2018). Putting the shine back on the academic innovation apple. *The evoLLLution*. Retrieved December 21, 2020, https://evolllution.com/revenue-streams/market_opportunities/putting-the-shine-back-on-the-academic-innovation-apple/

Bishop, M. J., & Keehn, A. (2014). *Leading academic change: An early market scan of leading-edge postsecondary academic innovation centers*. Retrieved December 21, 2020, https://www.usmd.edu/cai/sites/default/files/LeadingAcademicChangeProjectReport.pdf

Burnett, J. (1998). A strategic approach to managing crises. *Public Relations Review, 24*(4), 475-488.

Coburn, C. (2003). Rethinking scale: Moving beyond numbers to deep and lasting change. *Educational Researcher, 32*(6), 3-12.

Eckel, P. D., Hill, B., & Green, M. (1998). On change: En route to transformation. *Occasional Paper*, No. 1. Washington, D.C.: American Council on Education.

Kezar, A., & Eckel, P. D. (2002a). The effect of institutional culture on change strategies in higher education: Universal principles or culturally responsive concepts? *The Journal of Higher Education, 73*, 435-460.

Kezar, A., & Eckel, P. D. (2002b). Examining the institutional transformation process: The importance of sensemaking and inter-related strategies. *Research in Higher Education, 43*, 295-328.

Kirwan Center for Academic Innovation (n.d.). About. Retrieved December 21, 2020, https://www.usmd.edu/cai/about

Kirwan, W. (2013). How we can be better stewards of the American dream. *The Chronicle of Higher Education*. Retrieved December 21, 2020, http://chronicle.com/article/How-We-Can-Be-Better-Stewards/138503/

Setser, B., & Morris, H. (2015). Building a culture of innovation in higher education: Design and practice for leaders. Retrieved December 21, 2020, https://library.educause.edu/resources/2015/4/building-a-culture-of-innovation-in-higher-education-design-practice-for-leaders

Zimpher, N. (2012). 2012 state of the university address: Getting down to business. Retrieved December 21, 2020, https://www.suny.edu/about/leadership/chancellor-nancy-zimpher/speeches/2012-sou/

Adapting Vertically-Scaled Solutions Across Many Georgia Tech Classes

Jeonghyun (Jonna) Lee[a], Matt Lisle[b] and Troy Courville[c]

Abstract

The coronavirus pandemic prompted the Georgia Institute of Technology (Georgia Tech) to design a set of innovative trials focused on novel problems in delivering at-scale learning horizontally. This chapter provides insight into two specific technological tools that adapt solutions for vertical scaling and how these tools can be scaled across many classes. We explain how Georgia Tech identified strategic needs that emerged from the remote learning environment based on faculty survey findings. We then explore existing solutions that have displayed promise in a vertical scaling context, with a focus on early attempts to scale these solutions across the campus in order to enhance online learning environments. Finally, we discuss how Georgia Tech plans to continue scaling of these innovations.

Keywords: At-scale learning, remote teaching, horizontal scaling, higher education

Introduction

On March 12, the Georgia Institute of Technology (Georgia Tech) announced a campus closure for the Spring 2020 semester due to the public health crisis caused by the SARS-CV-2 (novel coronavirus) and the resulting disease, COVID-19. The resulting response to this crisis caused Georgia Tech to rapidly prepare faculty and students for emergency remote course delivery. While this response caused many issues across campus, Georgia Tech was in the fortunate position of having numerous faculty and staff who are accustomed to inventing and/or applying readily available technologies in innovative ways to solve novel problems. Many of these solutions have been piloted in limited at-scale classes, where the environment is set up to scale a vertical growth of enrollment, or "vertical scale" (Gazi & Baker, in this volume). The remote learning environment provided an interesting opportunity to select solutions that a) met a strategic need in the Georgia Tech remote learning environment, b) had positive pilot test results, and c) had one or more aspects that could transfer across many classes and faculty (i.e., horizontal scaling).

This chapter will discuss the research behind the selection and implementation of two educational tools specifically designed to support online learning and instruction at Georgia Tech. The ultimate goal of our paper is to provide practical insight into the usage of

[a] Georgia Institute of Technology, jonnalee@gatech.edu, ORCID: 0000-0003-1497-0561
[b] Georgia Institute of Technology, matt@c21u.gatech.edu, ORCID: 0000-0002-0820-3377
[c] Georgia Institute of Technology, troy.courville@pe.gatech.edu, ORCID: 0000-0002-2064-7405

http://hdl.handle.net/1853/64296

technological tools that can help enhance the ability to operationalize the horizontal scaling process across many online courses in the campus community. The first section covers how Georgia Tech identified strategic needs that were emerging from the remote learning environment. Specifically, Georgia Tech used faculty surveys to capture snapshots of how faculty have responded to the sudden transition from face-to-face to remote delivery of courses due to the novel coronavirus pandemic. Informed by the survey findings, we identify key issues and strategic needs in the areas of online instruction and learning. The second section explores existing solutions that have met a strategic need and displayed promise across a limited number of classes. The third section describes early attempts to scale these solutions across many faculty members, classes, and/or disciplines to enhance learning environments at Georgia Tech. The final section looks into the future and discusses how Georgia Tech might continue to scale these innovations.

The Emergency Pivot to Remote Learning

Between mid-April and early May, the Center for 21st Century Universities (C21U) at Georgia Tech invited all faculty who were teaching Spring 2020 courses on the Atlanta campus to participate in an anonymous online survey, which was designed to capture a snapshot of faculty experiences and challenges during emergency remote teaching. This survey study included only those faculty members who taught in-person class meetings prior to the pandemic-related emergency move to remote teaching during mid-March. The survey consisted of 20 questions with 18 closed-ended and two open-ended items, which asked participants about their demographic and course information, types of instructional adjustments, and general perceptions about the remote delivery of courses.

A total of 266 faculty members, who teach in one of six colleges at Georgia Tech, volunteered to respond to the survey. 55% of the total participants were tenure-track and 46% were non-tenure-track academic faculty (e.g., Academic Professional, Lecturer, Adjunct). In terms of total years of teaching experience at colleges or universities, responses were almost evenly distributed amongst respondents: 21% of the respondents reported 0-5 years, 20% 6-10 years, 17% 11-15 years, 11% 16-20 years, and 31% 20 years or more. On average, the respondents taught two classes during the Spring 2020 semester and had up to 60 students in their classes. Regarding the primary methods of instruction after the transition to remote teaching, nearly a half of total respondents (47%) reported that they used a combination of asynchronous (e.g., uploading pre-recorded lecture videos) and synchronous methods to deliver instruction (e.g., having a live session through a web conferencing tool). 35% reported that they mainly used synchronous methods while another 18% relied on asynchronous methods.

In this chapter, we focus on reporting the faculty responses that were related to their challenges that arose during the emergency remote delivery of courses. We observed several salient themes that emerged from faculty responses regarding challenges in online instruction. Most notably, many faculty commented on issues related to time management for instructional teams and challenges associated with receiving regular feedback on students' learning and progress. These findings served as a foundation that guided research questions in which we sought to identify effective tools to support horizontal at-scale learning.

Time Management

One of the survey questions in particular asked respondents to identify the primary source of any difficulties they might have experienced while teaching remotely. Among 257 total responses, 23% responded that there were no issues; while the remaining 77%, who did experience some difficulty, reported one of several possible sources of issues: "Internet connectivity" (19%), "Technical issues outside their control" (14%), "Teaching equipment issues" (12%), and "Other" (31%). Those who chose "Other," the most frequently reported response, were asked to specify their problem(s). One common refrain from faculty was their instructional teams' time management challenges. The increased demands on faculty impacted their ability to provide the same level of quality instruction they were accustomed to providing. For example, one instructor commented:

> It's taken more time than I expected to develop new material for online presentation. Previously I could just walk in to class and teach new material directly; if there were a few rough spots it was okay. Now I tend to want to fix all the rough spots.

Another mentioned that:

> It takes probably three times as long: I pre-record in multiple segments, and doing that takes longer and is mentally more demanding than just lecturing for a continuous block of class time. Then I'm online with the students during the class period, when we play the videos and I answer questions...

Three areas that affected instructional teams' ability to manage their time were content creation, grading, and student communication. Theoretically, we could improve the efficiency of one of these areas, such as student communications, to allow additional time to be devoted to the others. Researchers at Georgia Tech have had previous success with Jill Watson, an AI-enhanced virtual teaching assistant designed for an online degree program at Georgia Tech (Schroeder, 2018). Jill Watson answers common course questions from students, freeing faculty time to focus on student learning outcomes and engagement. Initial versions of Jill Watson are an example of vertical scaling, where many hours were spent developing a tool for a small

group of courses with high enrollment. We seek to examine whether such an AI-based tool can help large groups of faculty resolve time constraint problems. Also, can the up-front development time and effort, which is typically large, be reduced without sacrificing the tool's quality?

Student Progress Assessment

Another notable issue that emerged from the faculty survey was the difficulty of assessing students' learning and progress in (or near) real-time. On the same survey, faculty were asked to rate their remote teaching experience in several aspects, including delivering learning content, communicating with students, and assessing students' learning. We found that faculty reported the lowest level of satisfaction in student assessment, with less than half reporting that they were either "very satisfied" or "satisfied" (this was contrary to other areas in which more than 60% of faculty reported positive ratings). When these responses were disaggregated by the primary method that faculty used to deliver instruction, it showed that difficulties in getting spontaneous feedback from students tended to be salient particularly among those instructors who relied on using an asynchronous mode to deliver instruction. Interestingly, such challenges in the feedback process were also occasionally noted by those who adopted synchronous methods (e.g., having a live lecture session via a web conferencing tool). For example, in response to the survey question about issues in remote teaching, one instructor mentioned, "*Students are muted. Chatting is OK but few do it. Cannot get the "feel" for the students' comprehension of topics.*"

This issue in particular calls for attention because it is closely related to students' learning experiences. According to the results from an institutional survey distributed to students at Georgia Tech during the emergency online course delivery, when asked whether they were still achieving course learning outcomes with the change in delivery, only 23% (total n=5,379) responded that this was true in all their classes. Additionally, although many students felt satisfied with remote academic activities (44%), there was still a significant portion of students who felt either dissatisfied (22%) or extremely dissatisfied (7%).

A possible explanation for this outcome may be found in Moore's (1993) theory of transactional distance. According to Moore, as the transactional distance—psychological or communicative space between the instructor and students in a distant learning environment—increases, students need to become more autonomous in their own learning. Critical to supporting students' autonomy is feedback based on formative and/or spontaneous assessments, which in online learning situations is challenging. The lack of available tools to assess students' online learning and engagement in real time makes it difficult for the instructor

to provide appropriate support in timely fashion to students who fall behind. Subsequently, students who seek guidance on whether they are on track or how to improve their learning performances may feel lost.

One Georgia Tech faculty member has had previous success meeting this challenge in his online courses by creating custom tools to quickly identify students in need of an intervention from his instructional team. However, these tools required a great deal of technical expertise and up-front development time, which limits their ability to be scaled horizontally across campus. Can a campus-wide tool be created to achieve similar results in all Georgia Tech courses? In the following section, we provide detailed information about this particular example and discuss implications for how such feedback tools can be adapted to the context of horizontal scaling.

Lessons-Learned from Vertical At-Scale Solutions

As alluded to in the previous section, our analysis of the survey findings led us to search for related vertically-scaled solutions at Georgia Tech. In particular, we focused on two large-enrollment online courses: Knowledge-Based Artificial Intelligence (CS 7637) and Introduction to Computing Using Python (CS 1301). In these courses, faculty developed labor-intensive custom tools and processes to increase the quality of instruction. By highlighting the success and lessons-learned from the vertically-scaled solutions in these courses, we can explore the feasibility of horizontally-scaling these solutions across a large number of courses. These examples include the “Jill Watson 2016” Teaching Assistant for the CS 7637 course and customized student progress tracking tools used in the CS 1301 course.

“Jill Watson 2016” Teaching Assistant

Developed by Dr. Ashok Goel’s Emprize research team at Georgia Tech in 2016, the first version of the Jill Watson Teaching Assistant (“Jill Watson 2016” for short) served as a virtual assistant that supports both teachers and students in the CS 7637 online course. Jill Watson 2016 was initially trained by pairs of frequently asked *student* questions and *instructor* answers using previous semesters’ course discussion posts.

Jill Watson 2016 was able to answer a fraction of students’ questions quickly and efficiently (with its confidence value greater than 97%), freeing the rest of the instructional team to spend more time engaging with students and answering deeper questions (Goel & Polepeddi, 2018). Likewise, students could benefit from Jill Watson’s ability to address their inquiries in a prompt manner. Without support from Jill Watson, it would have been challenging for students to receive timely feedback that addresses individual concerns, given that OMSCS courses

typically have large class sizes. Jill Watson 2016's success in CS 7637 led to its deployment in five additional large, online classes in Georgia Tech's College of Computing over subsequent semesters.

Despite its success, Jill Watson 2016 had several shortcomings. Most notably, it required >1,000 hours to build the first instance and >100 hours to build each subsequent instance. This up-front investment would prove to be an obstacle to the Emprize team's goal of expanding Jill Watson 2016 into many classes across Georgia Tech. It also required a large set of question and answer pairs from previous semesters, which was not available for many courses.

In addition, Jill Watson 2016's use of previous discussion posts introduced bias into its algorithms (Eicher, Polepeddi, & Goel, 2018). In one example, a male student was asked to introduce himself in the course discussion forum at the beginning of a semester. He mentioned that he "will become a father for the first time," which would require him to miss some classes during the semester. Jill Watson responded by welcoming him to the class and congratulating him on the new addition to the family. In a later semester, a female student offered a similar introduction–saying that *she* was pregnant and would be missing some classes. Jill Watson responded by simply welcoming her to the class, but did not congratulate her growing family. This is because–in Dr. Goel's male-dominated course rosters–Jill Watson had previous question and answer pairs in which male students announced that their families were expecting the birth of new children. However, there were no previous question and answer pairs in which female students announced their own pregnancies. As a result, Jill Watson did not know how to respond to the female student.

CS 1301 Student Progress Tracking

For the second solution, we discuss an interesting example that comes from an online undergraduate course, CS 1301 (*Introduction to Computing Using Python*) offered at Georgia Tech (Joyner, 2018; 2019). The CS 1301 course has a quite large class size with an average of 220 students per section in the past three years. In general, the student body primarily consists of first- or second-year students who are pursuing majors other than computer science, and it is almost evenly distributed by gender. Students who are enrolled in this 17-week course, are expected to watch lecture videos, complete online problem sets and receive live feedback, and take tests asynchronously, which all take place in the edX platform. Dr. David Joyner, the instructor for this course, used custom Excel formulas and the edX gradebook to quickly identify and contact at-risk students in his course. This set of tools and processes enabled Joyner to

find individual students who fell behind on the recommended course schedule on a weekly basis.

The technical solution for these analytics tools generally relied on a manual process, as illustrated in the following step-by-step description. First, as up-front development work, the instructor creates an initial set of ~300 auto-graded homework problems (currently with ~500 problems). Next, the instructor exports a gradebook from edX in an Excel spreadsheet, and filters students by multiple variables. In the end, the instructor uses the spreadsheet to identify all students who are behind on some section and labels them according to their current status. Finally, the instructor created a formula in Excel that allows him to quickly send email messages to students. The tone of emails can be either personalized or formulaic depending on each student's particular circumstances.

As a consequence of this outreach, students are expected to be informed about how far they fell behind and seek available resources that can help overcome any learning challenges. Further, the instructor expects that the tool can increase students' awareness that someone in the course (either the instructor or a TA) actually cares about them. Despite these advantages, there are some obstacles to overcome in order for another instructor to use the same tools in a different course. For example, in addition to having at least intermediate-level skills in the Excel software, instructors are expected to make a substantial investment in time. Joyner noted that it typically takes about four hours to get the setup ready at the start of the term as well as about two additional hours every time he sends out a batch of emails (D. Joyner, personal communication, July 22, 2020). The method that he used to contact individual students who were at-risk was faster than writing hundreds of individual emails, but using something more automated would help instructors save more time.

Leveraging Vertical Solutions for Horizontal Challenges

After identifying previous examples of vertically-scaled solutions to the challenges identified by students and faculty during the Spring 2020 semester, the question remains how these could be horizontally-scaled across a large number of courses at Georgia Tech. Both vertical examples are from faculty members who are computer scientists–could they prove useful to less technical faculty? Both examples are used in computer science courses–would they be as effective in a variety of subject areas? Both examples were used in a small number of courses– could they be quickly implemented in a large number of courses? In both cases, early efforts are underway to answer these questions and make the solutions available to a large number of courses.

"Jill Watson 2019" Teaching Assistant

As previously mentioned, Jill Watson 2016 presented several challenges, including up-front development time, reliance on large data sets of previous course discussion posts, and indications of algorithmic bias. In response to these challenges, Goel's team began working on a new iteration of Jill Watson, coined Jill Watson 2019. They hoped to reduce the data bias by reducing the reliance on previous semesters' question and answer pairs. They planned to lessen the necessity of a large data set of discussion posts by training Jill Watson 2019 using a common document type found in most courses. Finally, they aimed to make the tool more scalable by reducing the amount of up-front development time required by faculty.

As a result, Jill Watson 2019 was launched during the summer 2019 semester at Georgia Tech. This new iteration of the agent answers students' questions about the courses based on its knowledge organized around a general ontology of course syllabi that the Emprize team has developed. Faculty members use a web-based application to generate thousands of question and answer pairs using their course syllabus. As a result, it requires approximately five hours of up-front development time, rather than 100 hours.

The tool has recently been tested and used in thirteen large courses at Georgia Tech since Summer 2019. Since the onset of the novel coronavirus pandemic, the need for Jill Watson Teaching Assistants in Georgia Tech courses has only increased. While Jill Watson 2019 has taken great strides towards scalability by reducing the up-front time investment, it still has not reduced the amount of resources required *during* a semester. For an effective implementation, Jill Watson 2019 requires a full-time instructional team member to spend approximately 25% of their time monitoring, analyzing, and facilitating the use of Jill Watson 2019 in every single course. Otherwise, the agent might be intentionally or unintentionally derailed by student questions that Jill Watson 2019 finds itself unable to answer. Going forward, this will be a critical obstacle to overcome in order to truly scale horizontally across a large number of courses.

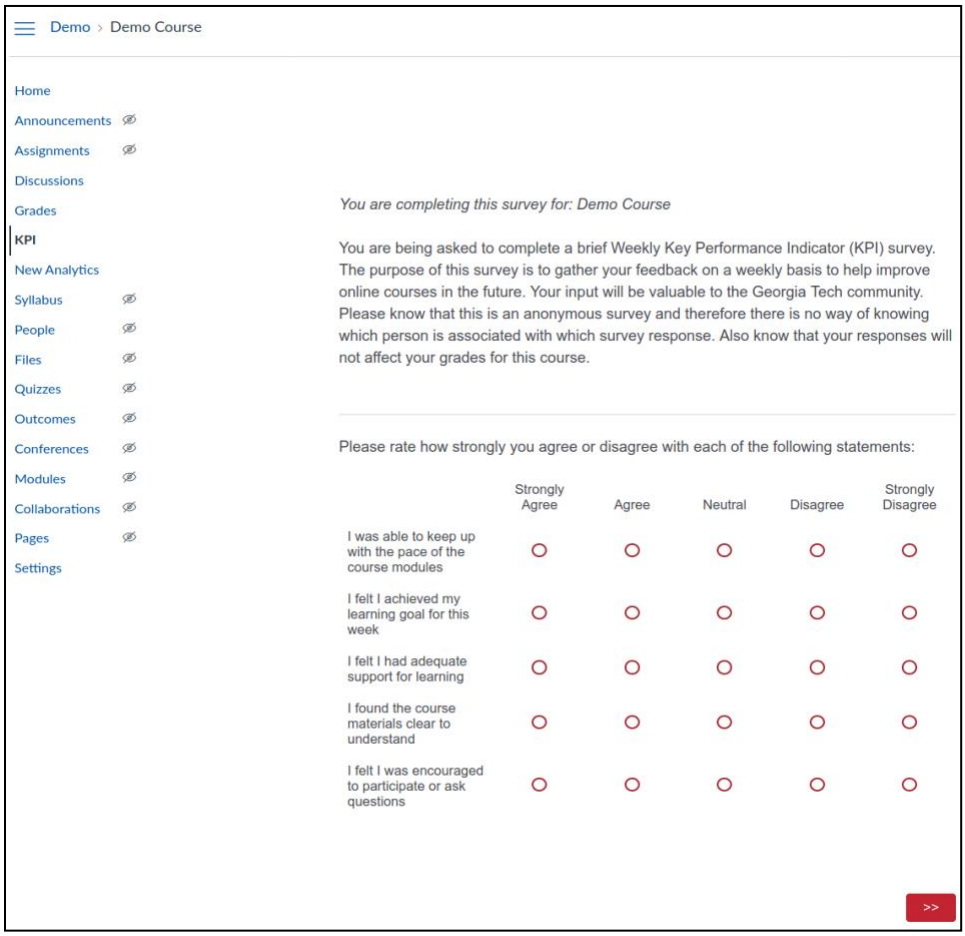
Key Performance Indicator (KPI) Tool

Upon learning about the tools and processes that Dr. Joyner used to monitor his students' progress in CS 1301, C21U set out to build a tool that would enable all faculty to quickly and easily monitor students' learning and progress in near-real time. C21U created the Key Performance Indicator (KPI) tool in Canvas, a learning management system (LMS) platform. KPI is an easily accessible tool designed to give instructors continuous weekly feedback from students and to help provide a sense of how students are performing in their course over time.

The KPI tool has close relevance to the above-mentioned example from CS 1301 in which Joyner developed a method to quickly identify when students are struggling in his class. The main difference is that the KPI tool can be quickly scaled to all Canvas courses at Georgia Tech without requiring extensive effort by faculty. When installed, the KPI tool appears in the course navigation of each course. When a student clicks the tool, they are directed to a short survey where they provide regular feedback on the pace of course modules, self-mastery of learning goals, support for learning, clarity of course materials, and class engagement (see Figure 1 for a sample screenshot).

Figure 1

Sample Screenshot of Student Survey View

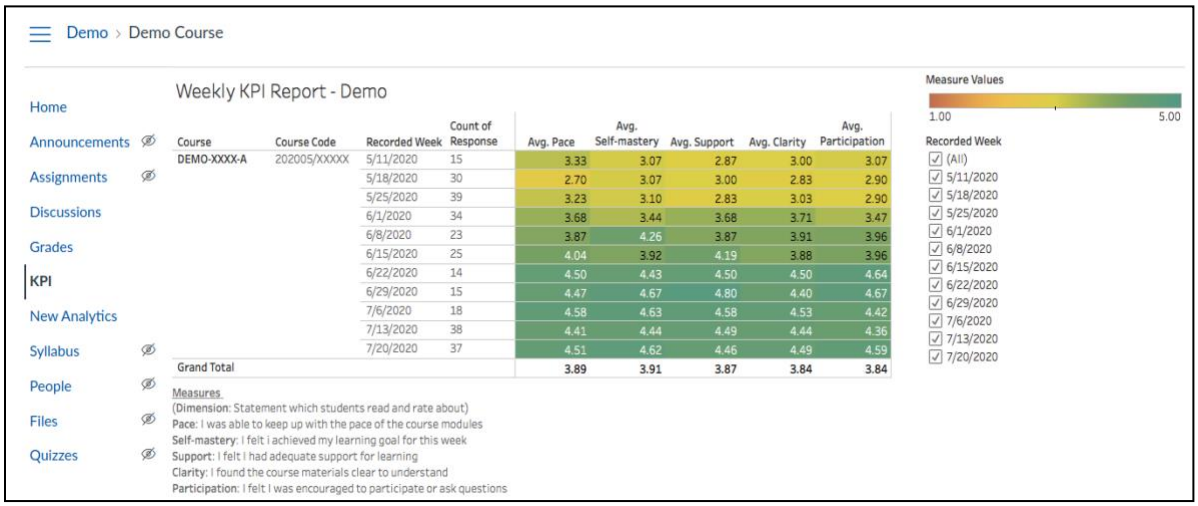


When instructors click the tool, they are directed to a dashboard that shows the students' submissions for their course (see Figure 2 for a sample screenshot). As a result, faculty can make adjustments throughout the semester based on the KPI ratings they are receiving on a weekly basis. A feature that we believe particularly helpful in this regard is a color-coded heat map. As shown in Figure 2, as an average rating for a dimension increases from the lower to

the higher end of the scale, the background color of a cell can change from red to green. This heat map allows instructors to easily track trends over time and across dimensions.

Figure 2

Sample Screenshot of Faculty Report View



Our key question is how much this tool can contribute to empowering faculty in the process of understanding student needs and taking actions at the right time in an online course environment. According to preliminary feedback from Summer 2020 pilot testers, faculty reported that they used students' responses mainly to adjust their instruction methods. Regarding the usage of the tool, other responses included monitoring students' progress and receiving more frequent feedback from students. One faculty member mentioned during an informal interview session that this tool was generally helpful for two primary reasons. One was that the tool was "simple" to use for both the instructor and students while it tapped into key aspects of online learning (i.e., the five dimensions about which the students submitted their responses). The other reason was that the tool provides feedback every week, and thus helps the instructor make the instruction better throughout the semester. The instructor further compared the KPI tool with the end-of-semester course evaluation survey, commenting, "(...) *knowing about the issue at the end of the semester… some part is like what is the point, you know?*"

As expected for a new tool, there were some challenges that need to be addressed in the future. One issue was low participation rates by students. For example, in one course, there was only one student who submitted responses, which severely limited the representativeness of the data. Another related issue was a short duration of data collection for more than a half of

all participating courses. As an example, some courses had the reasonable number of student responses but for less than three weeks. This made it difficult to detect meaningful temporal trends. It is possible that these issues were due to the shortened summer semester in which it was piloted, unfamiliarity with the platform, insufficient encouragement to participate, or the purely voluntary nature of adoption by the faculty and students.

Next Steps

In the previous sections, we identified recent successes of horizontally-scaling educational technologies that were previously designed to solve problems of vertically-scaled learning. These achievements will position Georgia Tech well for future online, hybrid, and even in-person courses and programs. However, challenges remain and must be considered going forward. This section outlines our strategies to continuously improve these tools and broaden their use throughout the Institute and the broader higher education community.

Jill Watson Teaching Assistant

Jill Watson 2019, the latest iteration of the virtual teaching assistant, has substantially automated the process of generating a Jill Watson agent before a class begins. However, it has not yet substantially automated the process of deploying, monitoring, and analyzing Jill Watson during a course. This remains the largest obstacle to wider adoption of the technology.

The solution might not be a technological one. As previously mentioned, the tool is still resource-heavy because the agent might be derailed by student questions without proper implementation. The Emprize team has started exploring the possibility of carefully onboarding new students to the concept of conversing with Jill Watson. In other words, a teacher might create a new thread in the course discussion forum that focuses on learning how Jill Watson works–a chatbot tutorial, so to speak. Students might ask Jill Watson what types of questions it can answer, what it cannot do, how it finds answers to questions, and so on. Potentially, this onboarding will reduce the urge by some students to “hack” the virtual agent, and improve other students’ comfort-level with working alongside the agent throughout the semester.

The Jill Watson Teaching Assistant is not a technology that one can build, deploy, and forget about. Goel’s team is not simply developing a technology, they are developing a sociotechnical system that balances the needs and abilities of an artificially intelligent agent, students, instructional teams, and researchers. Each of these parties are components of the system and must learn to interact and work efficiently together. In order to effectively scale the Jill Watson technology horizontally, these parties will need to participate in the design to ensure that the benefits of such a solution outweigh the costs of implementation. Furthermore,

continuous monitoring and evaluation of the impact of this technology across a wide range of online courses should be conducted. Ultimately, the evaluation will need to focus on addressing two key items, including: to what extent Jill Watson contributes to resolving time constraints among instructors and consequently whether this would benefit students' learning and their autonomy.

Key Performance Indicator (KPI) Tool

We also plan to build upon the early success of the KPI tool. During the Summer 2020 semester, we piloted the tool with 27 faculty members in 50 courses. Going forward, we are implementing a larger pilot during the Fall 2020 semester with the launch of a self-service mechanism that allows faculty to opt-in to using the tool in their courses. If our pilots continue to go well, we plan to automatically install the tool in all Canvas courses at Georgia Tech.

Our initial research into the tool revealed that students in some courses were regularly submitting weekly KPI reports, while other courses were seeing much less activity. We intend to explore what types of faculty support and development will lead to increased use of the tool. For example, we intend to provide sample language to be used in syllabi, course announcements, and other communications (e.g., built-in reminders) to help students see the value in the KPI tool. We will also continue interviewing and surveying pilot participants to try to determine other strategies to encourage wider adoption and use of the tool.

In addition, there are several features on our future roadmap for the tool. For example, Joyner's custom analytics tool for CS 1301 allowed him to intervene with individual students. Our hope is to find ways to allow such student interventions, while maintaining student anonymity to encourage honest responses. We are still researching this feature, but one possibility is that students who regularly respond with low ratings for a particular metric might be provided generic strategies for overcoming difficulties. If one student repeatedly submits low ratings for the clarity of course materials, for example, he or she might be provided resources from Georgia Tech's Office of Undergraduate Education for decoding complex topics, or perhaps directed to remedial materials to make up for a deficit in prior knowledge. Of course, if all or many students repeatedly submit low ratings for the clarity of materials the instructor knows he or she needs to modify the content.

Developing a Campus Roadmap

More broadly, these initiatives speak to the importance of universities' ability to monitor education technology-related challenges and initiatives across campus, allowing them to identify vertically-scaled solutions or prototypes that could be horizontally-scaled for larger numbers of

courses. At the Georgia Institute of Technology, one strategy for tracking our educational technology roadmap is to regularly convene a group of campus experts, in our case the Education Technology Steering Committee, to discuss initiatives like the ones described here. The results of these initiatives are also discussed by the Education Innovation Council, a group of administrators who can assist in broad implementation of successful innovations. These collaborations allow us to regularly surface efforts from one school or department that might be applicable to others.

Conclusion

No matter the institution, there is always a group of faculty, staff, and administrators interested in the application of innovative methods to solve novel problems. These grassroots efforts often stay housed within one or more courses, with small numbers of faculty who understand their purpose, application, and intended outcomes. The challenge becomes envisioning the solution to problems that might be somewhat related to the original problem or customizing the original work for a set of users whose level of technical experience might differ significantly from that of the original instructor. In many cases, the challenge of adapting vertically-scaled solutions across many classes is daunting. However, born out of the unique trials posed by the novel coronavirus pandemic are opportunities to explore horizontal scaling in a time where solutions to large scale problems are critical. Innovations like the newest iteration of the Jill Watson Teaching Assistant and the Key Performance Indicator (KPI) Tool are just two of the horizontally-scaled solutions that have emerged from this crisis. Moving forward, the challenge is to not let vertically-scaled solutions stay hidden within units or small but dynamic groups of instructors, but to create environments that widely foster the experimentation of these solutions across problems that impact many students and institutions.

References

Eicher, B., Polepeddi, L., & Goel, A. (2018). Jill Watson doesn't care if you're pregnant: Grounding AI ethics in empirical studies. In *Proceedings of the 2018 AAAI/ACM Conference on AI, Ethics, and Society* (pp. 88-94).

Gazi, Y. & Baker, N. (2021). Editors' overview. In Y. Gazi, & N. Baker (Eds.), *Moving horizontally: The new dimensions of at-scale learning in the time of COVID-19.*

Goel, A. K., & Polepeddi, L. (2018). Jill Watson: A virtual teaching assistant for online education. In C. Dede, J. Richards, & B. Saxberg (Eds.), *Learning engineering for online education: Theoretical contexts and design-based examples.* New York, NY: Routledge.

Joyner, D. A. (2018). Toward CS1 at Scale: Building and testing a MOOC-for-credit candidate. In *Proceedings of the Fifth Annual ACM Conference on Learning at Scale.* London, United Kingdom: ACM Press.

Joyner, D. A. (2019). Building purposeful online learning: Outcomes from blending CS1301. In A. Madden, L. Margulieux., R. Kadel, & A. Goel (Eds.), *Blended learning in practice: A Guide for Practitioners and Researchers,* (pp. 69-96). Cambridge, MA: The MIT Press.

Moore, M.G. (1993). Theory of transactional distance. In D. Keegan (Ed.), *Theoretical principles of distance education*, (pp. 22-38). New York, NY: Routledge.

Schroeder, R. (2018). Affordable and at-scale. *Inside Higher Ed*. Retrieved from https://www.insidehighered.com/digital-learning/blogs/online-trending-now/affordable-and-scale.

Appendix

List of the Emergency Transition to Remote Teaching Survey Questions

1.What is your current rank?
2. Please select the college (and school) in which you are currently affiliated and teaching at Georgia Tech.
3. What is your total years of teaching experience at college or university?
4. How many classes are you currently teaching during the Spring 2020 semester?
(Please enter the number of classes for each program level.)
5. How many students are in your class?
(If you are teaching more than one class, please indicate the average number of students.)
6. Which of the following were your primary methods of instruction in your face-to-face classroom BEFORE switching to remote teaching due to the campus response to coronavirus (COVID-19). Please choose all that apply.

Please respond to the following questions regarding your recent experience related to switching to remote teaching (or teaching online) due to coronavirus (COVID-19).

7. How do you currently deliver your instructions?
8. Which tool(s) do you mainly use to communicate with your students?
9. How would you rate your experience since transitioning to remote teaching? (1=very dissatisfied, 5=very satisfied)

- Delivering learning content
- Uploading worksheets or other learning materials
- Communicating with students (including GTAs)
- Holding office hours to address students' needs
- Assessing students' learning and progress

10. How much adjustment have you made in your current instruction for remote teaching? (1=none, 5=a great deal)
11. How well-suited is your course subject to online instruction? (1=not well at all, 5=extremely well)
12. How easy was switching in-person classroom activities to online activities since transitioning to remote teaching? (1=very difficult, 5=very easy)
13. If you have a student participation component in your grading scheme, how has this been adapted?
14. Which tool(s) have you used to adapt your assignment and exams since transitioning to remote teaching? Please choose all that apply.
15. Which of the following strategies have you used, if any, to preserve integrity and deter academic dishonesty during online exams? Please choose all that apply.
16. How would you rate helpfulness of the following resources for your transition to remote teaching? (N/A or haven't yet sought, 1=not at all helpful, 4=very helpful)

- Academic Continuity Resources from Georgia Tech Website
- Support from your department/college
- Support from OIT or other instructional technology experts on campus
- Shared tips from other faculty
- Webinars or other training opportunities

17. How would you rate your comfort level in the following areas that are recommended for a seamless transition to remote teaching? (1=very uncomfortable, 5=very comfortable)

- Updating the syllabus
- Moving quizzes and homework online
- Transitioning lectures to online
- Engaging students in discussion with online forums or chatrooms

18. If you have experienced any difficulty teaching remotely, what was the primary source of the issue(s)?

19. (open-ended) What strategy (strategies) have you used to enhance a sense of belonging/connectedness in your class since switching to remote teaching?

20. (open-ended) How have you been accounting for students in disadvantaged situations (e.g., limited access to Wi-Fi, learning devices/equipment, space for studying full-time, accessibility)?

Transforming Higher Education through COVID-19 Crisis: Experiences and Opportunities in The Netherlands

Ulrike Wild[a], Tim Stevens[b], Bertien Broekhans[c] and Janine Kiers[d]

Abstract

Large-scale online education plays a minor role in campus education in the Netherlands or most European higher education (HE) institutions. The COVID-19 crisis enabled two Dutch frontrunners in open and online education to implement their lessons learned from large-scale online education, digital tools and methods on campus. The changes do not automatically shape a future that focusses on the best learning experience for different target groups in order to successfully reach the learning objectives and attainment levels. In order to steer towards that future, changes are needed in policy, administrative processes and rules and regulations.

Keywords: Higher education in the Netherlands, online education, flexible learning experiences, change management, COVID-19.

Transforming Higher Education - Challenges in (Dutch) Higher Education

The blessings of large-scale online education, digital tools and methods have until COVID-19 not been largely embraced in campus education in the Netherlands or most European higher education (HE) institutions. In Europe, by far most universities have public funding, so affordability and accessibility of higher education are guaranteed. Therefore, the European system of higher education offers hardly any incentives to transform or reform the essence of traditional approaches of classroom education.

We consider the case of the Dutch higher education system, which has its base in the European Bologna agreement ("Bologna Process", 2020). Dutch universities are public institutions that are publicly funded. Accessibility, affordability, and high quality are regarded as important values. First, every student from the European Economic Area (EEA) that meets the admission criteria should be able to enrol in a bachelor or master program. Second, the tuition fees are low and subsidized. Students from the European Economic Area pay a minor percentage of the actual costs for their first bachelor and master's degree (2020-2021 € 2,143 per year). Approximately 80% of the actual costs are covered by government subsidies.

[a] Wageningen University, ulrike.wild@wur.nl, ORCID: 0000-0001-6841-0573
[b] Wageningen University, tim.stevens@wur.nl, ORCID: 0000-0002-6315-7633
[c] Delft University of Technology, B.Broekhans@tudelft.nl, ORCID: 0000-0002-2421-8309
[d] Delft University of Technology, J.A.Kiers@tudelft.nl, ORCID: 0000-0002-9898-329X

Additionally, the government offers the option of a loan to support their cost of living. The possibility to obtain an academic degree, and to participate in the student's life on campus is seen as a sort of basic right in European society. Moreover, the quality of the educational programs is guaranteed by the accreditation procedures. Important quality parameters are the pedagogical approach and the connection with the labour market.

In addition to the absence of financial incentives for change, pre- as well as during COVID-19, the traditional approach of classroom teaching was (and still is) institutionalised in policies, rules and regulations at universities, in the accreditation system, and in national policy and law. To support the ever-growing number of national and international students, and to encourage student success and keep university education manageable, the system is relatively rigid. To a large extent, the content of educational programs is predetermined. All organization is fine-tuned in such a way that 'standard' campus students follow fixed programs for full-time study and finish their studies on time: three years for bachelor's and one or two years for master's programs. There is, for example, hardly room for professionals to study part-time, to participate in degree programs or to take a class. The rigidity of the current HE system does support affordability and accessibility of HE, but limits (online and blended) innovation and (the speed of) transformation. Instead of initiating a university-wide transformation, the acceptance and use of digital tools, methods and didactics were stimulated and facilitated by special departments of the university, which focused on new target groups and lifelong learners (non-students) worldwide. These departments innovated, used and developed tools and methods for online teaching, in times where HE teachers relied heavily on more traditional methods of education for their campus classes. So far, the crisis was no reason to (temporary) relax or even reconsider the system. However, it appeared possible to find room to manoeuvre while respecting those.

Hence, the response in HE institutions to the COVID-19 crisis may look similar everywhere, when we moved to the emergency remote delivery of large numbers of campus courses, with an enormous effort from both academic and support staff. However, the implications hereof for the education system, including both on-campus and lifelong learning, may vary greatly from the European system depending on country or region. In this chapter, we would like to give you some insight into the potential impacts of the COVID-19 crisis for European higher education, based on experiences from two leading universities in the Netherlands; Wageningen University (WUR) and Delft University of Technology (DUT). We will introduce both universities and their online activities, then provide an overview of the developments during spring 2020, followed by a discussion on how these developments offer an

opportunity to reform the HE system: towards an online-based, resilient system which fully embraces tools and methods from online education, in order to accommodate both students and professionals in a flexible and personalized way.

Typical Dutch HE Institutions

In the Netherlands and Europe, WUR and DUT have been frontrunners in developing their online portfolios. The continued strong focus on, and investments in, programs to innovate education at both institutions have resulted in a broad offer ranging from short courses that focus to educate the world, to online programs for professionals that lead to a credential or degree and that are connected to academic credit. Both universities offer their Massive Open Online Courses (MOOCs) on the edX platform. Academic credit is only connected to MOOCs when these are supplemented with additional interaction and assessment, with the Micromasters®[e] as an exception.

Both WUR and DUT have similar drivers to develop online education which have been, and still are: to educate the world, innovate education and reach a broader audience. Since online education at both universities primarily targets non-campus students like lifelong learners, professionals, emerging economies etc., their support organizations have been set up as separate departments. These units provide facilities and guidance to teachers to design and develop online courses and programs, including product and portfolio management, marketing and promotion, learner administration, learner support, and moderation support.

While their approach to develop and offer online education show similarities, the two universities have their distinctive characteristics. WUR focusses on healthy food and living environment. Currently about 6000 bachelor's and 6500 master's students are enrolled in one of the 19 bachelor's and 30 master's programs. The mission of the university states: 'We educate students to become academic professionals, who can contribute to sustainable solutions for existing and future complex issues in the domain of 'healthy food and living environment' all over the world, and who take their social, personal and ethical responsibilities seriously.' DUT is the largest technical university in the Netherlands and covers practically the entire spectrum of engineering sciences. Currently, more than 13,000 bachelor's and 11,500 master's students are enrolled in 16 bachelor's and 33 master's programs. The mission of DUT states: 'We contribute to solving global challenges by educating new generations of socially responsible engineers and expanding the frontiers of the engineering sciences.' The two universities' activities in the online

[e] The Micromasters program consists of MOOCs that represent courses in a master program, and that include additional, proctored assessment. Learners that successfully completed the Micromasters, and that meet the entry requirements for the master program, can convert their Micromasters credit to academic credit.

space can also be distinguished: WUR has been an edX member since 2014, and in their about 50 MOOCs, 3 Micromasters, and 5 Professional Certificate programs are in 2020 more than one million learners enrolled. Next to the edX programme WUR offers three fully online degrees in a part-time mode and several courses (online and in-class) for professionals. DUT joined edX in 2013 as an edX Charter Member. In 2020 the offering was about 120 MOOCs, 1 MicroMaster and 17 Professional Certificate programmes (of which 2 in Spanish) with more than 3 million learners are enrolled. In addition to courses on edX, Delft offers about 70 online courses for professionals, of which 20 form part of a master's degree.

The vision of education of both universities emphasizes a more learner-centered approach for all campus education, which cannot be reached without a blended learning concept and the increased use of digital tools. Most of the education on campus is lecture-based and workgroup-based, with - depending on the topic - more or less emphasis on applied tutorials and labs. The online infrastructure, tools, materials and methods that have been developed for the online portfolio have to some extent penetrated campus teaching. Most teachers who developed online courses for non-campus students found that the materials could improve their campus courses. They were the first on campus to experiment with concepts like flipped classroom, online peer review and assessment, and intense blended learning. Despite these positive exceptions, until now online education has been mainly perceived as separate from campus education.

COVID-19 Crisis: Enforced Remote Teaching and Increased Use of Online Tools and Methods

The COVID-19 crisis forced a sudden change that was unplanned, abrupt and driven by external circumstances. Normally, all educational innovations that involved online teaching at our universities would be carefully planned and designed considering potential benefits. Risks and failures would be avoided, and innovations were driven and supported by the university's education departments. Now, online technologies offered the only solution to a very urgent and definite problem. Teachers played a crucial role in this sudden change: they were certainly not just the 'adopters' of innovations but became the very 'creators' or change-makers of the transition. More generally, the transition changed attitudes within the organisation (there is no choice), increased the available resources and attention for online education, and triggered the experimentation with a wide range of new information and communication technology (ICT) tools and new teaching methods. This transition, from online teaching methods as part of innovation projects (vertical at-scale learning), to online teaching methods as the only solution in

a crisis to offer higher education across programs (horizontal at-scale learning), had huge implications for the supporting organisation, the teachers, and the students.

To start with the first: all existing departments for educational support had to work closely together to support all teachers by this sudden change. Universities with a good infrastructure to support online education, such as WUR and DUT, benefitted hugely from their expertise and prior experiences. The didactic part of the challenge – addressed in this chapter - was mastered by several actions targeted on teachers such as:

- Forming a multi-disciplinary taskforce who managed the transition, consisting of experts from online education, scheduling department, tooling/IT, multimedia, pedagogy and teacher training, where assessment and privacy/security of specific tools needed specific attention.
- Organizing a single helpdesk for teachers where they could ask for support and advice nearly 24-7.
- Developing or adapting manuals, and organizing webinars, for all aspects of online learning as well as offering tailor-made didactic advice for teachers.
- Building courses and platforms for teachers that offer all instruction manuals, tips, best practices and new tools.
- Scaling up tooling like the virtual classroom, collaboration platform, and proctoring.
- Organizing working groups for teachers with similar problems (like lab-work, excursions, big courses with a high number of students, how to interact with your students).
- And finally: monitoring and analysing how the transition affected course didactics, teaching and the learning of teachers and students.

At the start of the crisis, research was initiated in which independent researchers and educational departments of universities collaborated to monitor and analyse the changes at several universities, such as WUR and DUT (Stevens, Brok, Noroozi, & Biemans, 2020) (VSNU, 2020) (NRO, 2020). Teachers and students were willing to cooperate in these projects and to share their experiences and perspectives. This helped the universities to get an unbiased and comprehensive picture of the situation (Crawford, et al., 2020). Intermediate results were frequently shared - both within and across the universities - to inform and improve education and to learn from the interpretations of everyone involved. Let us summarize the insights and experiences of teachers and students during the first months.

Overall teachers were satisfied with the various educational services, training, and IT tools, and they felt supported by colleagues and the organisation at large. However, teachers did struggle with the sudden transition. At WUR for example, teachers experienced increased

levels of stress (66%) and an increase in workload (80%) (Stevens, et al., 2020). Half of the teachers did not like online teaching, and the majority (80%) believed that the learning of students is worse in online education. They particularly missed the informal and personal interaction with students. Although many teachers experienced high work pressure and did not like online teaching, they engaged in a high level because they found it very important to offer students online education of high quality. Moreover, most teachers felt that they possessed the skills (both ICT skills and didactical skills) needed to be able to teach online, and they felt that they managed to move their course online successfully. Overall, the results suggest that although teachers were not happy with 'being forced' to teach fully online, they had the support, skills and infrastructure to be able to move their course online to their satisfaction. Additionally, we saw that teachers with experience in online or blended teaching felt more comfortable to make the transition to online.

A large part of the research was focussed on investigating the experiences of students (using surveys, interactive sessions, and interviews). Overall, the results show that students missed the social interaction and had difficulty in keeping up the motivation to study from home. Students also prefer campus education, but in comparison to teachers, a larger group favours blended education. Moreover, many new (online) teaching methods were evaluated positively, such as new types of group assignments, polls during live lectures in the virtual classroom, and recordings that can be paused and re-watched to make notes and learn at one's own pace. Most importantly, the average grades and pass rates show *no difference* in comparison to previous years. The student evaluations were also stable: overall students were equally satisfied with education. Hence, despite the sudden and unprepared move to 'online only', grades and satisfaction rates did not go down.

After the first emergency response, we observed a trend towards a structural redesign of courses that include online tools and methods for synchronous and asynchronous interaction. At WUR for example, more than half of the teachers said that teaching the course online stimulated them to rethink the course design. The percentage of teachers that was able to move entirely to online increased from March to May, and from May to July. Moreover, teaching methods were more often revised rather than just maintained or fully replaced. Many teachers (about 60%) that used an online teaching method for the first time would like to maintain the adaptation next year and use on-campus gatherings only for learning activities in which social interaction is essential. Also, at DUT the focus of teachers and support shifted from tools, tips and tricks to a more structural redesign of courses for online or blended education. Teachers felt

supported but the results showed a great variance in adaptation to the online mode; many teachers indicated that they value and prefer education-as-usual.

The Challenge Ahead: Moving from Crisis to Change Management

Since the start of the study year 20-21, the Dutch campuses are open again, but in a 1.5-meter social distancing setting. Classroom teaching is possible up to 20-30% of the 'normal' physical capacity compared to pre-COVID -19. Being familiar with the strengths and weaknesses of online education, teachers now have the opportunity to move from purely online education to a 'blended approach', as long as we do not get new lockdown orders. As we pointed out in the beginning, embracing online tools and methods would be a necessary precondition to reform the system. But we observe that teachers and the organization are not yet fully ready, and in order to prepare a lasting change there are two important challenges: Teachers' attitudes towards digital culture and upscaling educational support.

Teachers' Attitudes towards Digital Culture

Although the credo of the association of Dutch universities is to teach "on campus if possible, online because possible", many teachers now indicate that they prefer to teach fully on campus and would like to go 'back to normal' (VSNU, 2020). Despite positive student evaluations and learning results, they believe that the learning performance of students is worse in online education. Although they are relatively positive about their own skills and performance, and their experiences with specific online teaching methods, they still show a negative affective attitude towards online teaching in general. This might result in resistance to move towards a lasting more online-based education. It is difficult to determine exactly what shapes this attitude. We should acknowledge that this sudden crisis is unwanted and comes with a lot of difficulties in all aspects of our social lives, and this general feeling may influence teachers' attitudes towards online education in general. Moreover, since on-campus teaching is the default mode in our education system they are likely to be more aware of the benefits of on-campus teaching – and what they miss- rather than they are of the potential benefits of online teaching methods. Online education also generally means a change in the role of the teacher: from a person in the very center of the classroom to somebody, who rather arranges a series of learning experiences, online and offline. Perhaps, if teachers get accustomed to this role and get recognition from the students, the resistance will decrease. Additionally, workload and stress seem to play a pivotal role in the general attitude towards online teaching and the motivation to make a change. Teachers already experience a high workload and many teachers indicate that the transition to remote learning significantly increased their teaching workload.

It is important to note that there are quite a few differences between teachers. Researchers conducted a cluster analysis and identified different types of teachers: groups of teachers that differed in motivation, stress, skills, and beliefs (Stevens, et al., 2020). It is essential that education departments consider and address each of these teacher types. Especially the teachers that are more conservative and critical can be off-the-radar in institutions that are used to working 'vertically' (vertical at-scale) in innovation projects with mostly engaged teachers ('the early adopters'). In fact, the results showed that there was a large group of teachers that felt unheard and wanted to go 'back to normal'. This group of teachers requires a lot of attention in communication and policies, in order to facilitate a more widely supported, 'horizontal' transition (horizontal at-scale).

Upscaling Educational Support

Most important in the short term – and with an eye on the future - is to organize support for teachers differently. Online tools and methods have the potential to make education more effective and ultimately to decrease the workload of teachers. The transformation should be organized in such a way that it not just improves the quality of education, but also is advantageous for teachers in terms of workload and/or rewards.

In our universities, the teaching and learning services were focused on supporting high numbers of campus students and classroom teachers, and growing numbers of (lifelong) online learners and few teachers new to online education. Each teacher was coached on the job by a learning developer to deliver a great learning experience in his or her course. The focus was on offering high quality online education in relatively few courses to large amounts of learners.

As a result of COVID-19, the latter changed in particular. Large amounts of teachers familiar with current educational practices and the learning management system needed to be supported to offer their teaching in another mode of delivery. Not the numbers of students made the big difference, but the large amount of teachers that were in urgent need for assistance, to deliver the same high quality as they did before. That support needed to be reorganized.

In the emergency response, the organizational set-up to coach all instructors individually was transformed overnight to more general support, in the form of guidelines, best practices, tips & tricks, factsheets, decision support matrices to select appropriate tools, and training. In the following semester, the prepared response phase, most teachers had some – limited to extensive - experience with online teaching, and the support organization was set-up to support at scale the (re)design of courses to deliver high quality online learning experiences. More than before, teachers had to figure out themselves how to teach online, what choices to make, what tools were suitable, how to test etc. They increasingly started to help each other, and share

experiences. Given the high number of teachers in distress only limited personal support was available. That lead to new experiences in a new context. For example, teacher had to select and implement digital tools themselves, to apply in an virtual learning environment they were not used to, both technically and didactically. Learning developers on their turn, had to trust that these teachers are capable and efficient to pick the best alternative and figure out how to apply. For both the teachers and learning developers this was new and uncomfortable.

For the teaching and learning services, these developments mean change in the approach of support, quality control, and relations between teachers and learning developers in (re)designing education for fully, partly, or temporarily online delivery. Table 1 below aims to explain this shift in approach and what it may imply in the nearby future.

Table 1

Shift in Focus and Approach in Vertical and Horizontal (At-Scale Learning)

	Past (vertical): Online for many learners	Future (horizontal): Online by many teachers
Focus of course design	Design a course for online first, transfer to campus (impact). Aim for learner-centered design, with a close link to their practices and interests.	Design a great learning experience. Flexibility in course design and delivery options (mode, planning, moderation). For students and sometimes professionals (towards microcredentials).
Teacher support	Individually coach teachers in (re)designing their courses, selecting appropriate methods and tools for constructive alignment. The result is custom based support, addressing the needs of the teacher and the specific topic and course only.	General support: Offer training, tools, factsheets etc. to teachers. Impersonal support, instructional designer/learning developer most often not inaugurated in the specific course. Individual coaching in exceptional cases. Learning community of teachers.
Role of learning developer	Support teachers to design for, and support, large groups of learners.	New roles for instructional designers: Support many teachers. Guide teachers to professionalize.
Dependency	Teacher and instructional designer co-produce courses and are thus in control of the quality of the online learning experience (support essential).	Instructional designer cannot be involved in, and have control over, all courses (teacher can do). Trust the (new) professionalism of teachers, their engagement and commitment to high quality delivery.

On Our Way to a More Innovative System?

We started this chapter claiming that the absence of a financial driver and the fine-tuned nature of our HE system have been in the way of development towards a more open system, where online and blended education offers more options to serve other target groups and give way to more flexible education paths. In the short term, the COVID emergency response and education crisis-management is not expected to change the essence of the publicly financed Dutch and European HE system, its scale or economic accessibility. Such systems do not change overnight. Institutionalized paradigm, culture and standards have a very slow pace of change, but disruptive situations may set operational and managerial change in motion (Williamson, 1998).

At the same time, the first signals are positive. Teaching and education support during the COVID era may have created an opportunity to steer towards online or truly blended, learner-centered and flexible higher education. Teachers now prepare for back-up alternatives and think about how to offer their courses dual-mode, using the full range of digital tools and methods. They prepare for physical absence of a teacher or student in class (due to medical condition, family condition, social setting, limit access to public space) or ultimately to offer education to a class of students again in case of the next lock down. That enables a more flexible program.

The lessons from the COVID-19 response are having their effect. From now on, it is realistic that the delivery of education can not only be threatened by a fire (destroy a location for lectures), but also by a pandemic (disturbs the mode of teaching). Options to make educational programs more resilient for future threats by embracing online tools and methods are considered. This may affect managerial strategic decisions for the years to come. Processes of digitalization and flexibilization of HE will be incentivized, to start in the day-to-day operations in the short term. This gives options to enlarge our education portfolio to broader target groups. Rules and regulations will ultimately change, since campus, remote and online will be mixed.

Both teachers and students begin to ask for a vision for the future of their university education, on the medium and long term, from their managers and boards. Together we should build a vision for the future where the best learning experience for different target groups will be central in order to successfully reach the learning objectives and attainment levels.

In order to steer towards that future, changes are needed in policy, administrative processes and rules and regulations. It will anyway be a bumpy road as long as the pandemic remains. So far, we've experienced that there are many rules, regulations and policies in place that are grounded in a specific mode of delivery of education, and do not offer flexibility to adapt

to changing circumstances and new modes of delivery. It may be worthwhile to reconsider these with the purpose of offering a good learning experience to students. This will only work in small steps, but an important step has been taken: more online-based/digital tools are used by more teachers and in more courses on campuses.

References

Crawford, J., Butler-Henderson, K., Rudolph, J., Malkawi, B., Glowatz, M., Burton, R., . . . Lam, S. (2020). COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *Journal of Applied Learning & Teaching, 3*(1) 9-22. doi:https://doi.org/10.37074/jalt.2020.3.1.7

NRO. (2020). *Overzicht lopend corona-gerelateerd onderwijsonderzoek*. Retrieved September 18, 2020, from: https://www.nro.nl/corona-gerelateerd-onderwijsonderzoek

Stevens, T. M., B. d., Noroozi, O., & Biemans, H. (2020). The transition to online education during the Corona crisis situation. *4TU.Centre for Engineering Education*. Retrieved January 7, 2021 from: https://www.4tu.nl/cee/innovation/project/13042/the-transition-to-online-educatio

VSNU. (2020). *Universiteiten in coronatijd - Hoe de Nederlandse universiteiten samenwerken en oplossingen bieden in coronatijd*. Retrieved September 18, 2020, from: https://www.vsnu.nl/files/documenten/Universiteiten%20in%20coronatijd.pdf

Wikipedia article. (2020) *Bologna process*. Retrieved September 2020, from: https://en.wikipedia.org/w/index.php?title=Bologna_Process&oldid=992846363

Williamson, O. (1998). Transaction cost economics: How it works; where it is headed. *De Economist, 146*(1), 23-58. doi:https://doi.org/10.1023/A:1003263908567

SECTION IV

Scale as a New Paradigm

Horizontal Scaling of Online Learning in the Post-COVID19 Society: Reflections from Kerala

Arun Surendran[a] *and C.P. Vinod*[b]

Abstract

India's nation-wide COVID-19 lockdown, which began on March 24, 2020, was relaxed in June with the exception of educational institutions. However, the Government of the Kerala state took a decision to reopen the schools as per the regular academic calendar on June 1st through online mode. This massive horizontal scaling drive of online education, named 'First Bell', brought all the research and extension agencies under the General Education Department together with the Kerala Infrastructure and Technology for Education (KITE). This chapter examines the First Bell initiative on the larger back drop of exploring the genealogy of the horizontality and scaling of education in Kerala.

Keywords: Horizontal scaling – socio-political movements - decentralization – online learning

Introduction

The state of Kerala in southern India garnered worldwide attention in April 2020 for its effective tackling of the global COVID-19 pandemic. Though the state was affected severely by the second wave of the virus, initial success in managing the pandemic made the term "Kerala Model," a term used in the 1970s to differentiate Kerala's unique first-world level of socio-economic indices from the rest of India, which was decades away in terms of progress, popular again. Kerala is a small federal state of India situated on the south western coast with a total population of 33,387,677l (Census 2011). It is an increasingly urbanized state, leading the country with it stop position in human development indices. Kerala was also declared the first fully literate state in the country.

The state government decided to start the new academic year, as usual, on June 1, despite the pandemic, in a fully online mode. This momentous shift to online, in the context of COVID in a state with close to 4.5 million students, is the topic of this chapter. We will first briefly trace similar major shifts in the history of Kerala society. Then, we detail the state's

[a] Trinity College of Engineering, mallusarun@gmail.com, ORCID: 0000-0001-9109-1961
[b] Local Government Commission, Kerala, vinod.vel@gmail.com, ORCID: 0000-0003-1127-3760

response to COVID-19 in the education sector after giving a snapshot of the response at the national level. We conclude with a discussion of the road ahead.

Genealogy of Horizontality and Scale

In this section, we delineate the major historical changes in Kerala, which enabled universal access to modern education. We see horizontality as a possibility of change in every momentous historical phase, introduced through institutional reforms and radical ideas. Scaling happens subsequently, through organised interventions and popular participation.

Kerala is historically different from other states in India in human development, particularly in the area of universal literacy and education. The traditional social system of Kerala was caste-based, constituted by endogamous occupational units. Only a privileged few who belonged to the communities in the 'higher order' could access formal education within a rigid hierarchy[1]. Knowledge was circulated and exchanged within the closed circles of lower levels of the social pyramid through the vernacular and oral means, often labeled as "ignorant". Local communities transferred the craft and skills attached to the subsistence technology from one generation to the next. This knowledge asset was appropriated in the local production system controlled by the upper strata of the society. If this was the case a century ago, today Kerala's achievements in human development are widely acclaimed for its advanced position in all the indicators at a level that is comparable to the status of many of the world's advanced economies (Drèze & Sen, 1998), thanks to different kinds of social mobilisation and state actions.

The state was able to offer online education across all segments of its population due to the interplay of government agencies and various other socio-political forces in the past hundred years. The British colonial administration, missionaries and indigenous spiritual and social reform movements played crucial roles in shaping the modern institutional framework for universal education. Nationalist and revolutionary movements of the freedom struggle against the British also became social and political literacy movements, in effect, producing materials for mass consumption by adapting well to the newly created environment of printing and publishing. After India's independence in 1947, a Communist government came into power in 1957 through the ballot box in Kerala, a historic and strange marriage between a revolutionary ideology and an electoral democracy bound by a national constitution. The far-reaching impact it created in a brief period of time was due to the two critical reforms: to redistribute the land and to promote universal education (Lieten,2002).

Early Foundations

Formed as a federal state of India in 1952, based on the commonly spoken language Malayalam, Kerala was formed from north Malabar, middle Kochi and southern Travancore principalities. The British had introduced modern education from the very early 19th century across all these regions They replaced the indigenous system of education, an exclusive opportunity for 'higher castes,' with the universal model. They took various steps like the introduction of an education code a legal reform to liberalise the elite control of education in 1909-10, special help for disadvantaged sections of students, new vernacular schools at all levels and other improvements in order to universalise access (Nair,1976; Tharakan, 1984). Kerala had a higher literacy rate for both sexes than all other districts in the Madras Presidency and also higher than Malabar and that of rest of India[2]. Mass literacy has been acknowledged as a crucial factor in shaping the development trajectory of the state in the later years that is to demonstrate the capability of a society to achieve higher development index in spite of its relatively poor economic growth (Drèze & Sen 1995).

Horizontal Reform Movements and the New Techno Environment of Literacy

Social reform movements emerged in Kerala in the late 19th and early 20thcenturies, especially from underprivileged communities that asserted their right to education, as a response to this creation of various inclusive avenues to social mobility. Missionaries introduced and popularized the technology of printing and publishing, as these served an important role in spreading the message of the Bible. Social movements were also beneficiaries of this newly created techno–environment. There was an upsurge in reform movements within various communities of Hindus demanding dignity in general and rights to access various human development avenues, including education, in particular[3].

Strong political movements subsequently emerged in a fight against British colonialism as well as the landlordism of the upper castes. The first was the core Nationalist movement that focused on liberation from the British while the Communist movement carried atwin agenda, that is, not only freedom from the British but also from internal structures of domination like castism and landlordism. Land redistribution and the formation of a united Kerala became the slogans of the Communists in their campaign (Namputiripad, 1984). Communication infrastructure through mass circulation of printed materials was strengthened by both the Nationalist and Communist movements. The people's library movement was part of these larger movements. Local leaders and activists were connected to small libraries and reading rooms in their localities which became public spaces for discussions. Social education proceeded with the collective reading of newspapers and other literature, legally or illegally imported (Nair, 1994).

Big Leap and Its Long-Term Effects

In 1957 Kerala elected the Communist Party to form its first government as a clear manifestation of the majority will to accept the idea of modernity. The first action taken was to issue an ordinance to prohibit the eviction of tenants from their land. It got passed later in the Assembly, with provisions to enable a massive land redistribution that would benefit largely the middle sections in the social hierarchy. Education reforms were the second major action of the government (Nossiter, 1982; Lieten, 2002).

The reforms intended to provide universal primary education and a judicial regulation of school management to ensure quality. The combined effect of land and educational reforms and the public demand for political mobilisation helped advance Kerala's education in the following decades. Literacy rate increases across decades demonstrate this outcome (See Table 1).

Table 1

Kerala's Literacy Growth Over the Years (In %)

Year	Persons	Male	Female
1951	47.18	58.35	36.43
1961	55.08	64.89	45.56
1971	69.75	77.13	62.53
1981	78.85	84.56	73.36
1991	89.81	93.62	86.17
2001	90.86	94.24	87.72
2011	93.91	96.02	91.98

Census 2011 Gov of India

The government-sponsored total literacy campaign in the 1990s needs a special reference here. A program called '*Sakshara Keralam',* a participatory campaign for three million learners, needed around 400,000 instructors, 3,000 master trainers, 2,000 district level trainers, 250 state level key resource persons and 50 state level guides (Kumar, 1993).

According to the Household Social Consumption report on education published by the Ministry of Statistics, the literacy rate in Kerala was estimated to be above 96% in 2018, while the national average stands at 77%. Narrow urban–rural disparities in literacy rates, the lowest dropout rate (nearly zero) between classes 1 and 10 and the near total enrolment in schools among the school-age group should be understood as positive outcomes of a long historical process. Kerala's achievement on the educational front has been widely acclaimed and often referred to as a model (UN/CDS, 1975; Franke & Chasin, 1994).

Horizontal Structures of Local Government Institutions

Another vital factor instrumental in Kerala's development path is effective implementation of the state administrative decentralisation program. With the 73rd and 74th constitutional amendments in India, Kerala is among the few states which successfully devolved power to local self-government institutions which are district, block and village level *Panchayats* (councils) falling under rural areas and Municipal councils in urban areas. The state also devolved around 40 percent of the plan fund to local bodies through a People's Plan Campaign in 1996 (Bandhopadhyay, 1997; Thomas Issac & Franke, 2000). Education is among the 29 administrative functions transferred to local bodies supported by the devolved fund. Functional supervision of the schools was transferred to the Panchayats, which had the capacity to formulate projects for infrastructure development and quality enhancement. With the strengthening of local government institutions, elected leaders at the neighbourhood level became responsible for monitoring the access to education and also the quality of its delivery.

Broad-based structures of elected representatives at the local level are crucial to the success or failure of government schemes. In the village Panchayats, a standing committee on education, with an elected representative as its chairman and one of the head teachers from among the schools in the village as the convener, is supposed to monitor the progress of such schemes and also the quality of material environment of learning. Parent-Teacher Associations (PTA) and Mothers' PTA, an exclusive body of mothers, take care of the day-to-day functioning of the schools.

Proper synergy between state and local levels of government lead to effective local implementation. Especially in the case of the 'First Bell' online education initiative during the COVID-19 crisis, local action helped significantly in identifying families who were without proper facilities and providing them access through the local reading rooms and mobilising other necessary resources.

Pre-COVID-19 Snapshot of the Indian Education Sector

In a country with India's diversity of 1,600 recognized languages and 22 official ones, no national average estimate of any survey can capture and convey the regional variations effectively. With a population of 1.2 billion growing at 1.1% annually, the Indian economy is just over three trillion dollars.

According to the 2019 All India Survey of Higher Education, India has 993 universities, 39,931 colleges and 10,725 stand-alone institutions of higher education. The total enrollment of 37.4 million in higher education translates to a gross enrollment ratio of 26.3% for the age group of 18-23. Interestingly, at the university level the majority (53%) is enrolled for distance

education without physically attending classes on a regular campus. The faculty-student ratio is close to 29 to 1.

At the school level, India has over 1.5 million schools, over 1 million of which are run directly by the government. The school education system has around 9.5 million teachers serving the 248 million students.

The National Survey Sample in 2014 had estimated that only 27% of Indian households had access to the internet, while the accessibility rose as high as 85% among urban youth enrolled in University. However, since 2014 multiple factors, especially the drastic reduction in mobile data pricing due the market entry of Reliance Jio telecom, has changed the scenario with broadband connections rising from 61 million to 625 million. 1 GB data per day costs only $0.26 in India reportedly the lowest in the world. The Internet penetration rate currently is estimated at close to 50%. The National Broadband Mission is working towards providing at least 50Mbps speed internet to all Indian villages by 2020 with a tower density of one per 1,000 and doubling the fiber optic cable route length.

On July 9, 2017 the President of India had launched the major digital initiatives of Swayam and Swayam Prabha. Swayam stands for Study-Webs for Active-learning for Young Aspiring Minds. Developed under the aegis of the Department of Human Resources and the All India Council for Technical Education with the assistance of Microsoft, the platform supports over 2,000 courses geared towards students from Class 9 to post-graduation. The platform has 203 partnering institutions with the majority of the content created by institutes of national importance. By March 2020 Swayam had a student enrollment over 12 million with 6.5 million certifications completed.

Swayam Prabha is the set of 32 direct-to-home television channels powered by India's GSAT-15 satellite. They deliver educational content round the clock geared towards all the school levels and preparatory material for higher education. Four hours of new content is added daily and also hosted at the web portal. The National Digital Library provides free access to 7 million eBooks and the National Academic Depository stores the digital record of the degrees, certificates and diplomas issued.

These digital initiatives helped the nation's education system to cope, by and large, with the COVID-19 crisis while some of the examinations had to be cancelled and others moved online.

Kerala's COVID-19 Response

The first three positive cases of COVID-19 reported in India were in Kerala as early as January 30, 2020. These were students who had returned for vacation from their universities in

Wuhan, China. The state, having successfully dealt with the *Nipah* outbreak in summer of 2018, went immediately on alert in a proactive mode. In February, evacuation flights were arranged for more students who were stranded in Wuhan. Twenty-eight-day quarantine was instituted. The calamity warning issued by the state was withdrawn in February as no further cases were reported among the 330 returnees tested. However, in the first week of March, three positive cases in a family that returned from Italy and did not abide by quarantine rules sent the state back into high alert. By March 10 a decision was taken to close all the educational institutions. While the school year had almost come to a close by then, it was still the middle of the semester in the higher education institutions and universities. The year-end examinations for the lower classes were cancelled. The state wide public exams for Class 10 and 12 were halfway through and the last among them were postponed.

The unprecedented closure and uncertainty of the future forced the education department of the government and all the stakeholders in the education sector into rapid stocktaking and decision-making.

The State Institute of Educational Technology (SIET) of Kerala, under the General Education Department, started functioning in 1999 along with its seven counterparts in other states. The IT @ School Project, launched in 2001 to promote ICT enabled education in the schools in the State, was expanded and became the Kerala Infrastructure and Technology for Education (KITE) in 2017. The VICTERS television channel operated by KITE was the first Complete Educational Television Channel in the country. In 2019, Kerala became the first state in India to declare access to the Internet as a basic right.

Teacher Training

In March 2020, KITE took the traditionally offline information technology (IT) training for schoolteachers, fully online. The training had previously been conducted in three batches in 1,000 locations across the state with 25 teachers and two trainers in each batch. KITE now delivered the same training online in 5 days to 81,000 primary school teachers in 11,274 schools. In the past, KITE had developed a MOOC, titled KOOL (Kite's Open Online Learning) that benefitted 12,000 teachers to complete their mandatory IT training online without sacrificing regular school hours.

The Transition

Kerala has been the leading state in the nation for using Free Open Source Software effectively in its government school classrooms that has reportedly saved the state close to half a billion dollars as it was implemented in 14,000 schools. KITE introduced a customized version

of the Big Blue Button free open source software for video conferencing and online classes. All the textbooks of the syllabus were digitized and posted online for free downloading.

In May, the government issued instructions for maintenance of the IT equipment available in schools during the shutdown. The order revealed that close to 120,000 laptops, 70,000 projectors and 4,500 DSLR cameras, LED screens, webcams and multifunction printers had been issued to each as part of the Hi-Tech school project to the 16,000 government-run and government aided schools in the state.

It was announced that the new academic year would begin fully online on June 1st. The decision immediately opened up the debate in the public sphere about the digital divide in society. Political parties, NGOs, social commentators and media outlets actively discussed the new “Haves and Have-Nots”, class separation brought about by the lack of access to digital gadgets and online platforms. The Chief Minister assured the public that the Victers TV channel will would be the main mode of content delivery since television penetration in the state was nearly 100% while reliable broadband access was closer only to 75% despite being declared a fundamental right. NGO groups like RIGHTs unveiled plans for open access support systems for the students from marginalized and underprivileged segments of the society.

Besides the government schools described above, majority of the private sector schools, run by individuals and groups through non-profit entities, that were abreast with the developments in technological pedagogical content creation quickly adapted to the crisis with well-produced short duration content to facilitate anytime, anywhere learning that was supported by live interaction with the teachers in smaller groups.

First Bell

Before launching First Bell, the fully online education initiative to overcome the COVID-19 shutdown, on June 1st the government scrambled to identify those who might be left behind. It was estimated that around 261,000 students, mostly from remote areas in three districts did not have access to cable television. For them, access was arranged through the local libraries and community centers. Transportation was also readied for the students to these newly identified hubs. This was implemented using *Kudumbashree*, the two decades old, 5 million strong women empowerment and poverty eradication program of the state.

The modules for different classes were prepared by different governmental agencies like the State Council for Educational Research and Training, State Institute of Educational Technology and Samagra Shiksha Kendra (SSK) in addition to KITE. The headmasters and teachers were tasked with ensuring that each student had access. They were also instructed to follow up with the students using mobile phones and online chats after each broadcast.

The broadcast timetable was from 8:30 am to 5:30 pm Monday through Friday in half an hour to two-hour slots for each class. For Class 10 and 12, there were repeat telecasts in the evening; for other classes repeat was during the weekends. The first two weeks were considered a trial run with the same programs repeated each week.

On June 1st, 4.1 million students tuned in to the Victers TV channel and its YouTube channel. Their teachers interacted with them before and after each intended broadcast segment. Worksheets were provided to students from Class 1 to 7.

The first day's classes went viral. The content delivered by some of the teachers amassed millions of views on YouTube. They became media sensations overnight. As with any viral content, there were certain instances of cyber bullying and comment box abuse, which were immediately dealt with by the state police Cyber dome. As of August 2020, the Victers YouTube channel hosts over 1,000 class videos, over 1.5 million subscribers with several videos clocking over 500,000 views including from the USA and Europe as well. The Android app of the channel had over 2 million downloads. KITES website was supporting 27TB of traffic daily. Tamil and Kannada medium videos were also uploaded to support the bilingual students in the districts of the neighboring states of Tamil Nadu and Karnataka.

June 2nd, however, brought the tragic news of the suicide of a Class 10 girl allegedly depressed because the lack of access to online classes. Belonging to a poor family, the television set at her home was beyond repair. The incident reignited the discussion about the digital divide. The state government, non-governmental organizations, charitable institutions, political outfits, celebrities and even individuals spontaneously came together for a massive social drive in the following days. Thousands of television sets and smart phones were donated. By mid-June, the state education minister announced that only 2,800 students remained without access out of the initially identified 261,000 students. For these students, laptops from their nearby schools were arranged through the teachers. The government also announced 75% financial support for those students seeking to buy a new TV. Different schools did home delivery of the textbooks as well for those without gadgets for the digital versions.

Adivasis, the tribal communities of Kerala, constituting around 1.5 percent of the population, are the ethnic minorities of the state who don't satisfy the State's widely appreciated parameters of human development and often speak a different dialect than that used in the schools. Experts see the social exclusion as a common marker regarding their status in education, economy and politics. Dropping out is a major problem among the tribal children due to various cultural and economic reasons.

The Samagra Shiksha Kerala (SSK-Comprehensive Learning Kerala) introduced online lessons for Class I students in six tribal dialects for the first time and telecasted through the KITE Victers channel. SSK roped in tribal mentors and volunteer teachers for implementing this project. Resource persons from the respective communities translated the lessons into their dialect. Tailor-made content was also locally created through workshops. It has been running successfully in all the tribal regions in the state and SSK plans to step up the program to higher classes and also in all tribal dialects[4].

The Higher Education Sector

The tertiary institutions including Universities and Colleges had switched to online education by April 2020 for the reminder of the semester that was cut short by the COVID-19 crisis. The Minister for Higher Education who is also a Professor of History at the University of Calicut inaugurated the program with his live lecture on a history topic.

Faculty in the roughly 1,300 colleges in the state that has 13 universities catering to close to one million students started using various internet platforms for live online classes as well as audiovisual content delivery beginning in June. In a survey by the Kerala Technological University, it was found that 90% of the students have access to the Internet. Those with connection problems or device issues were asked to seek support from the college nearest to home as travel restrictions were in place.

The Road Ahead

The question of the digital divide that COVID-19 laid bare in the educational context has spurred both the state and the national governments into rapid implementation of the broadband access policies. Digitization of textbooks and ‘anytime, anywhere’ accessible multimodal content has unshackled education from the classroom walls. Teachers have transformed themselves into learners of technological pedagogy. The deeper involvement and scrutiny from parents has added an unexpected facet that brought pertinent discussions about the quality and quantity of our “learning systems” into the public sphere.

In July 2020, the Government of India introduced the new National Education Policy (NEP), fully revised for the first time since 1992. It outlines drastic changes in the schooling and higher education structure over the next 10 years. Online education has been highlighted not only as a backup but also as a path to affordable, accessible education. India’s premier engineering college, the Indian Institute of Technology, Chennai, has already announced a fully online Bachelor’s degree in Data Science.

Despite these rapid and concrete changes, it is reasonable to conclude that the complete replacement of conventional systems with online modes of education will not happen in the near future in Kerala. The existing socio-political system is also structured around the offline mode of schooling with interests of the parents, organized teachers' unions and private management that converge in favor of conventional practices. For many working parents, schools serve the purpose of day care space as well. Education has transformed over the years as a wealth creation business and the powerful interests associated with the investments would resist any of the fundamental structural changes that obstruct their profits. Nevertheless, COVID-19 has undoubtedly broken new ground in the concept and practices of the learning process. In spite of initial resistance, the conventional system had to accommodate the changes due the demand from students, parents and teachers and the pro-active role of the state government. Both the private and public systems responded effectively and adapted well to the pandemic induced disruption.

In Kerala, educational institutions lose a good number of working days each year due to natural calamities and political disturbances like general strikes, student protest, floods, torrential rains etc. Online learning becoming an institutionalized practice points to the new post-COVID-19 possibility to minimal loss in learning hours.

Reaching the have-nots is another important outcome of this movement. Kerala has already initiated delivering classes to tribal children in their own languages. This can be broad-based to other similar vulnerable sections in other parts of the country as included in the trilingual model of learning advocated by the new national policy. Kerala will undoubtedly take this initiative forward in getting education to the corners of the region untouched by the light of 'renaissance and modernity' since these issues have been the dominating state discourse since the last century.

A most desirable shift in the paradigm in the long run could be the embedding of education through enhanced learning experiences at the center of environmentally integrated human life. From this standpoint technology will be re-invented as a deeply humanizing enterprise. Our hope is that Kerala will take this cue from its unbridled spirit exhibited in the past century through all its humanizing movements as well as the present relentless fight against this historic pandemic.

Notes

1. In a traditional sense, castes in Kerala are endogamous social groups based on occupation and a social hierarchy affiliated to an ideology of purity and pollution according to the broader division of Hindu order of Indian society known as 'Varna'

System (for a summary on Caste in Indian history, see; Banerjee Dube, 2010). Robin Jeffery has written extensively in the context Travancore region of Kerala about how education became accessible to the 'lower' communities with the activities of Missionaries and the comprehensive reforms introduced by local rulers under British supervision and how religious minority like Syrian Christians emerged as powerful communities through modern education (Jeffrey,1976).

2. William Logan, who served as District Collector of Malabar made a reference about the 'mass ignorance' in the villages of Malabar. He was pointing out the absence of modern education and the world view among the masses (Logan, 2000).
3. A major phenomenon observed in the late colonial period across Kerala was emergence of social reform movements in the society at large, but with special reference to the backward and marginalized communities. Historical writings acknowledge three kinds of reasons for these movements, one is colonial education, the second is Christian missionaries and third is religious movements based on traditional humanitarian values (Sarkar & Sarkar, 2008). It was in Kottayam in 1811, as part of his evangelical mission, that the Rev. Benjamin Bailey, who is considered the father of modern Malayalam printing technology, established the first printing press in Kerala with British administrative support. 'Rajya Samacharam', the first journal in Kerala, was published in 1847 by the German Basel Evangelical Mission from Nettur, Thalassery in Malabar. The legendry Sree Naryana Guru (saint teacher) of Kerala made the famous proclamation "unite through organization, civilize by education" to his own Ezhava community members, which became an inspiring slogan for all other 'lower caste groups' also to start mobilizations for education. He founded an organization called Sree Narayana Dharma ParipalanaYogam [SNDP] in 1903 and also started a journal,'Vivekodayam'. A broader social awareness movement based on reading and writing influenced other leaders like Ayyanakali, Poykayil Appachan, Sahodaran Ayyappan, Vagbatanandan who became the catalysts for larger societal reformation to follow (Isaac & Williams, 2016).
4. Interview with Dr.Kuttikrishnan A.P (State Project Director), Samagra Shiksha Kerala

References

Bandyopadhyay, D.(1997). People's participation in planning: Kerala experiment. *Economic and Political Weekly, 39*, 2450-2454.

Banerjee- Dube, I. (2010). *Caste in history*. Oxford University Press.

Centre for Development Studies and UN (1975). *Poverty, unemployment and development policy*. Bombay: Orient Longman.

Drèze, J., & Sen, A. (1992). *Hunger and public action*. Oxford: Oxford University Press.

Frankie, R. W., & Chasin, B. H. (1994). *Kerala: Radical reform as development in an Indian state*. California: The Institute for Food and Development Policy.

Isaac, T. M. T., & Franke, R. W. (2000). *Local democracy and development; People's campaign for decentralised planning in Kerala*. New Delhi: Left Word.

Isaac, T. M. T., & Williams, M. (2016). *Building alternatives*. New Delhi: Left Word.

Jeffrey, R (1976). *The decline of Nair dominance; society and politics in Travancore, 1847-1908*. London. Sussex University Press.

Lieten, G. K. (2002). Human development in Kerala: Structure and agency in history. *Economic and Political Weekly, 37*, 1539-1544.

Logan, W. (2000). *Malabar manual*. Thiruvananthapuram: Kerala Gazetteers Department.

Kumar, S.M. (1993). Literacy movement in Kerala: One-step forward, two steps backwards. *Economic and Political Weekly, 28*, 2187-2191.

Nair, G. P. R. (1976). Education and socio–economic change in Kerala, 1793-1947. *Social Scientist, 8*, 28-43.

Nair, R. R. (1994). Role of public libraries in the national movement in Kerala. *International Congress of Kerala Studies, 3,* 127-128.

Namputiripad, E. M. S. (1984). *Kerala society and politics*. New Delhi: National Book centre.

Nossiter, T.J. (1980). *Communism in Kerala; A study in political adaptation*. California: University of California Press.

Sarkar, S., & Sarkar, T. (2008). *Women and social reform in modern India*. Indiana: Indiana University Press.

Tharakan, P. K. M. (1984). Socio-economic factors in educational development: Case of nineteenth century Travancore. *Economic and Political Weekly, 45*, 1913-1928.

The Future of Learning is Blended

Anant Agarwal

Abstract

The adoption of online learning within universities has been sporadic and rare. However, with the onset of COVID-19, higher ed institutions worldwide have been forced to switch from in-person to online learning. This transition, while challenging, is dramatically increasing the adoption of online learning in higher education. However, for online learning to endure, it must be integrated across the entire campus, or in other words, it must truly scale horizontally. Blended learning, which allows universities to integrate online learning with in-person learning, provides the best of the two learning models and offers a much lower resistance path to campus-wide adoption. Blended learning increases business continuity and has unique pedagogical benefits which increase learning outcomes. It is the future of higher education.

Keywords: blended learning, at-scale learning, MOOCs, future of higher education, educational transformation

Introduction

The COVID-19 crisis has been a wake-up call to higher education, which until recently had sporadic adoption of online learning. As many as one-third of colleges and universities nationally in the US offered no or few online courses before the pandemic hit (Lederman, 2020a). Even in instances where courses or programs were available online prior to the COVID-19 crisis, offerings were limited to a specific department or program, such as an online MBA or nursing degree, rather than scaled horizontally across the institution. Similarly, while the MOOC movement, or massive online open courses, brought many universities into online education, with the exception of a few, it often was a separate "teach the world" activity rather than an integral part of the college curriculum.

With universities and colleges now having to rapidly adapt to online learning, there is a new opportunity for schools to further embrace remote learning by horizontally scaling access to online courses across all departments. However, for enduring adoption across a school, online learning must become completely synergistic with campus education.

edX, agarwal@edx.org

Blended learning, which combines online learning with face-to-face learning opportunities, allows schools to bring online learning onto campus in a more gradual fashion, sort of a gentle slope approach, thereby increasing the likelihood it will be integrated across campus.

Why Blended Learning Is an Advantageous Model for Higher Education

Blended learning allows students to switch between face-to-face and online synchronous and asynchronous learning seamlessly. There is no one-size-fits-all model, and its implementation may look quite different from institution to institution, and even program to program. However, the flexibility that blended learning offers students and schools to switch between in-person and online instruction offers unique benefits over in-person learning or strictly online learning.

For starters, blended learning enables greater business continuity and resiliency because it allows you to dial up online instruction when needed, which is becoming critical as universities grapple with disruptive circumstances such as the COVID-19 crisis and the threat of future pandemics. Climate-related natural disasters are also on the rise, with fires, hurricanes, snowstorms, and floods increasingly forcing universities to shut down temporarily. The impact of these disruptions has been detrimental to some schools and students. Temporary closures of campuses have decreased enrollment and slowed students' progress toward graduation, and in some cases, even caused faculty to seek employment elsewhere (Mello & West, 2020). A blended learning environment would ensure that colleges were prepared and able to switch to online learning when there were disruptions that limited the ability of students and faculty to gather in person.

Second, blended learning can also increase learning outcomes and engagement. The majority of students (85 percent) who have taken both in-person and virtual classes believe the online learning experience was equal to or better than attending in-person courses on campus (Magda & Aslanian, 2018). However, while online learning can be more engaging, it's not the right fit for every student. Time management and motivation can be significant obstacles to an exclusively online learning environment. Some students simply need the additional accountability and face-to-face human interaction an in-person class can offer. Blended learning acknowledges the challenges associated with online learning as well as the advantages by providing for in-person interaction while also allowing students access to online learning and its benefits, such as greater flexibility and convenience.

Even during normal times, access to online learning offers more flexibility. Students can stay on track with their courses, even when classes conflict or students take a semester off for an internship or to study abroad. Online learning also allows students to learn at their own pace,

making it more productive for many students and boosting learning retention by allowing students to revisit the lectures as often as they need.

Many of the mechanisms common to online learning also increase learning outcomes. For example, instant feedback, an affordance of online learning, is a proven approach to increasing learning outcomes (Kadlowec, Chen, & Whittinghill, 2005). Professor Michael Cima created a blended version of his freshman chemistry class at MIT by replacing written homeworks with computer graded versions for this reason (personal communication, August 4, 2020).

At Harvard University, Professor Greg Nagy, previously used components of his edX course, *The Ancient Greek Hero*, on campus where he teaches the same subject to undergraduate campus students. Now, during COVID times, when his course is no longer offered live on campus and is being taught completely remotely to campus students, Professor Nagy is replicating experiences previously used in the online edX version of his course to help engage his students and drive a feeling of community in addition to successful learning outcomes. For example, Professor Nagy has redeployed assessment techniques developed for his edX MOOC as part of the Harvard undergraduate remote experience.

In Professor Nagy's words, "It is possible in an online classroom setting to create community that is not impersonal. The potential for achieving a new sense of community was the big thing that we learned from our experience in working with edX. Also, more generally, we discovered that humanities can in fact be done online in a successful way."

Online learning, together with a study buddy or as part of a group, also provides a way for students to collaborate and connect in a richer and deeper way while learning than in-person lectures. Research by Alison Burke at Southern Oregon University has shown that collaborative learning results in college students achieving better grades, feeling more satisfied with their education, and being more likely to remain in college (2005).

Amol Bhave, who participated in a blended learning experience while attending MIT, noted that he was more comfortable with being able to take online courses because they allowed him to learn in a manner that worked best for him. "I could skip things I had already learned, fast forward through the lectures or follow along at my own pace," He also felt that the online courses enhanced collaboration between students. "Everyone can see a question and post an answer," Bhave said. "This is something the traditional model isn't able to achieve in the same way."

Incorporating online learning into traditional learning models is also more appealing to Gen Z and millennials. They have a strong preference for greater flexibility in their lives,

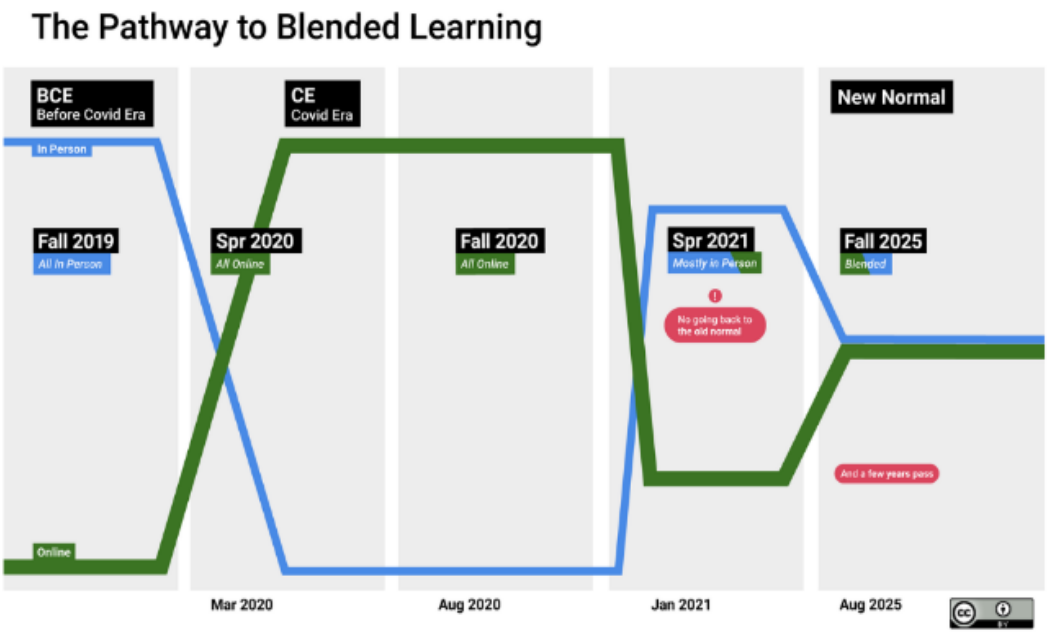
including in their academic experience. Even before the coronavirus pandemic, 59 percent of Gen Z and 66 percent of millennials said they expected technology to transform how college students learn in the future (Pearson, 2018). And within ten years, 76 percent of people of all ages think more college and university students will attend school online versus attending a traditional school (Pearson, 2019).

The Path to Blended Learning

From finance to telemedicine, COVID-19 has significantly sped up the adoption of remote work and virtual communications across a number of industries. As companies have moved to fully remote work environments, many are finding that their workers have increased productivity (Gelles, 2020), and are thinking about blended work environments where certain weekdays are designated work-from-home days for everyone.

Figure 1

The Pathway to Blended Learning



As Figure 1 illustrates, COVID-19 will have a similar impact on online learning in higher education. Following the green curve in the chart which reflects the *ulta tawa* (inverted pan in Hindi) curve of online learning adoption, in the Pre-COVID Era (PCE), universities rarely offered online learning opportunities for on-campus students. Instead, in person and on campus was the universal model. However, with the onset of the COVID Era (CE), universities were forced to shut down in-person classes and pivot to fully remote learning in a matter of days. Given the

continued spread of the virus and the estimates on when a vaccine may be available, remote learning will continue through the end of calendar 2020 and possibly even into the start of Spring of 2021 for most universities.

Results are mixed on how effective this transition to online learning has been so far. According to an Inside Higher Education survey, two-thirds of campus leaders said their institutions were “extremely or very successful at having technology support available, achieving faculty buy-in, and ensuring the availability of technology tools”. Yet, when it came to maintaining student engagement, only 31 percent of leaders said they were extremely or very successful, and 53 percent said they were moderately successful (Lederman, 2020b).

Faculty reactions have also varied as they pivoted to teaching online, but many have embraced it. edX works with academic institutions around the globe to help them transition to online learning, and as CEO of edX I've heard from a few converts. One colleague of mine, who pivoted to remote teaching halfway through the spring semester, mentioned that his first online lecture was the most engaging lecture he'd given the entire semester. There were more students attending class, they asked more questions, laughed (via emojis) and by virtue of being able to revisit the online lectures at any time, I'll wager they retained more knowledge as well.

Given the bumpy start to online learning, the Summer/Fall of 2020 will be crucial to improving the online learning experience. Universities will have had more time to train faculty and create online experiences using proven techniques specifically designed for great learner experiences and outcomes, including providing active learning with short videos and interwoven exercises, online assessments with instant feedback, self-paced learning, peer learning, gamification, and virtual labs, spaced repetition, and mastery learning. This will allow students and faculty to achieve better outcomes and engagement with the online learning model.

As it becomes safe to meet in-person, likely sometime in Spring 2021, many universities and faculty will try to rubber-band back to the in-person teaching model. However, it won't be a complete regression to the PCE days of zero online learning. As depicted by the trough in the green curve in Figure 1 there will still be a fair amount of online teaching and learning on campuses as many faculty and students will have realized the benefits of online learning and will be eager to continue to reap those benefits. In engineering speak, there will be some hysteresis in the system.

After Spring 2021, the pace of blended learning will steadily increase as schools build more capacity and experience with creating and sharing online content. Rice University, for example, is suggesting a dual delivery approach starting as early as Fall 2020 (Ramapriyan,

2020). Australia's Curtin University is going even further and planning a move to an "online first" model for new course development (J. Downie, Deputy Vice Chancellor, Academic, Curtin University, personal communication, May 27, 2020) that universities around the world will be well served to emulate, which will accelerate the blended model for campus teaching.

Samantha Fisher, managing director of the education practice at Accenture, has commented that "the COVID-19 crisis may have spurred the shift to an era of pervasively hybrid education" (Lederman, 2020b). A survey by Inside Higher Ed affirms this viewpoint with eight in 10 campus leaders saying they would "reassess the long-term mix of in-person vs. virtual education they offer post-COVID-19" (Lederman, 2020b). Thus, I anticipate that by 2025 most universities will have a more or less even split of online work co-mingled with in-person activities, thereby ushering in the "new normal" of blended learning in higher education as depicted by the pan handle of the ulta tawa in Figure 1.

Approaches to Blended Learning

Viewed in the broadest sense there are three primary modes of blended learning: Online Before Campus, (OBC), Online During Campus (ODC), and Online After Campus (OAD). The three differ in the granularity and timeframe over which in-person learning and online learning are interwoven. Universities that incorporate all three modes will have the most success in staying relevant in the decades to come and horizontally scaling online learning across departments of a university. Here's a deeper look at each mode of blended learning.

Online Before Campus (OBC)

With this form of blended learning, the traditional timing of higher education beginning, and high-school secondary education ending, is completely blurred. OBC is a model in which high school students take online courses from a university before entering a college campus and can get college ready and start earning college credit while still in high school. Students also benefit from this model because they can sample and complete coursework in a field they want to explore or are interested in at a low cost before committing significant time and money toward applying for and enrolling in an on-campus degree program.

For example, edX learner and MIT graduate, Amol Bhave, took courses from MIT via edX while still in high school in India. This experience provided a powerful tool for expanding his learning, opened up the door for him to attend MIT, and gave him a head start once he got to MIT for his on-campus degree. "I didn't know what MIT was or have any plans of going abroad for college, but these courses introduced me to MIT. It got me really motivated to continue

learning and apply to universities outside of India," said Bhave, who went on to work at Facebook, and most recently joined an investment banking firm in New York City.

MicroBachelors® programs and MicroMasters® programs offered by edX provide students two different ways to participate in online learning before campus. MicroBachelors programs enable students to learn online and accumulate credit on a university transcript. They can then transfer to a degree program on-campus that accepts the transfer credit.

MicroMasters programs are a series of graduate-level courses designed to provide deep learning in a specific career field. Not only do many employers recognize these certificates for their job relevance, but in a survey of MicroMasters students who earned the credential, 87% said that they achieved a career advancement as a result of the credential (edX, 2020). Students interested in pursuing a full master's degree can also earn a MicroMasters and then apply to a university that accepts their MicroMasters program certificate. If accepted, the MicroMasters certificate enables students to accelerate earning their degree because it counts towards 25 percent to 50 percent of the credit and cost of the Master's degree.

Online During Campus (ODC)

The second and most common mode of blended learning is offering online learning courses or course components to on-campus students. While on-campus, online learning can be interweaved at various granularities - course level or within a course.

Having fully online courses available to matriculated students allows universities to address course scheduling conflicts and provides a solution for completing courses off-cycle, particularly when students are participating in off-campus internship programs, study abroad programs, or have other work/life conflicts.

In an A-B experiment at MIT, they used the edX platform to offer a fully online version of their Circuits and Electronics course to on-campus students for credit during Fall 2016 and Spring 2017 semesters in addition to the usual in-person version. Students not only performed comparably well, but also reported feeling less stress and had more flexibility (MIT, 2017). Many other universities, including Georgia Tech, have conducted similar studies with similar results (Joyner, 2018).

ODC can offer even more blended learning opportunities, such as interweaving in-person learning and online learning within a single course. In a blended learning experiment at San Jose State University, they implemented a blended model of learning, merging learning activities from an online MOOC on edX with in-class, team-based problem solving as part of a required undergraduate circuits course. Given that this blended learning model provided students with the benefits of both online and in-person learning, it's not surprising that the

results showed significantly better outcomes. In the SJSU study, the pass rate went from 59% in the traditional in-person approach to above 90% (Ghadiri, 2014), and these results at SJSU were repeated over multiple semesters. Other blended learning versions of ODC have also shown success at community colleges as well (Bebell & Petersen, 2015).

Before the COVID Era, some universities were already toying with blended learning online/on-campus delivery. I believe that in CE, or the COVID Era, with faculty and students more comfortable with the online learning format, we will see many more schools look at implementing more online learning opportunities for students while on campus.

Online After Campus (OAC)

Blended learning can also be a powerful tool in helping people upskill or reskill to remain relevant and competitive in the workforce. OAC is a model in which a learner continues to take online courses once they transition into the workforce after moving on from a traditional four-year undergraduate experience.

Given the rapid advance of technology, it is estimated 65 millions of millennial-aged people and younger will need to continually reskill for the 40+ years of their work-life (Fry, 2020). Additionally, a recent edX survey showed that over a quarter (26%) of those surveyed were likely to seek additional education to help them find a recession-proof job. Even for employees who may not have immediate concerns about their job security, a LinkedIn 2018 Workforce Learning Report found that 93% of employees are more likely to stay with a company longer if it invests in their careers (LinkedIn, 2018).

The continuation of online learning, even after campus, makes it possible to incorporate upskilling and reskilling seamlessly into a busy schedule. Larisa, an edX learner, is a great example of how blended learning can still be valuable in life after campus. Larissa earned her bachelor's degree in Biology but decided after graduation that she wanted to learn web development. She started by taking a professional certificate program in Front End Web Development from W3 (the World Wide Web Consortium) on edX. The online format of the program allowed her to learn more about web development without taking time off from her current job. After finishing her certification, she was able to pivot into an entirely new career path and is now in a leadership role with a new company (Goulart, 2018).

How to Rapidly Implement and Scale Blended Learning Horizontally across The Academe

Historically, the biggest barriers to online learning have been a lack of acceptance by both faculty and students. But the need to pivot to online-only learning due to COVID has dramatically changed faculty and students' acceptance and comfort with online learning. Thus,

the remaining challenges deterring broad adoption and implementation of online learning are tactical.

Addressing Faculty Capacity to Develop and Deliver Online Courses

One of the biggest barriers to greater adoption is the capacity to develop online courses. Course creation can take considerable time and effort and requires faculty training. On average, pre-COVID -19, my experience has been that even universities at the forefront of the MOOC movement had capacity to create only about 10-20 quality online courses per year, which means it can take three to four years to build an entire online program for a single department. Remote lectures with zero instructional design or online problem sets delivered as a talking head via your favorite webinar software like Zoom, Google Hangouts, Webex do not count.

The recent shift to online learning due to COVID-19 has already helped faculty begin to make this leap and get training. Pre-COVID-19, 97 percent of institutions reported using faculty with no prior online teaching experience for some of their courses (Cengage, 2020). However, a recent survey of college presidents from Inside Higher Education, showed that from March to June 2020, the level of success universities reported in training faculty less familiar with digital delivery grew 29 percent, from 18 percent in March to 47 percent in June (Lederman, 2020b). While there is still more room for improvement, the ability of colleges to rapidly ramp up faculty training shows that moving successfully to an online learning environment is possible, even in a short amount of time.

For instance, to address the urgent need to provide university faculty around the world with training in teaching online courses, ASU, UT Arlington, and edX have all launched courses on the edX platform that provide strategies and best practices on online learning and teaching. Because these courses are online themselves, it is easy to scale the offering to as many faculty and universities as need the training. Additionally, the courses provide insights into how to make online learning engaging and relevant to students by top scholars and practitioners in the field of online learning.

Yet, even as faculty training increases, the ability to add additional content could also be impacted by budgetary concerns. In an Inside Higher Education survey, 55 percent of universities said they believe they will be reducing their academic portfolio in the future, further constraining the development of online courses (Lederman, 2020b).

Implementing Modular Design and Development of Content

One way to overcome budgetary and time constraints with online course creation is to share content horizontally across departments and even universities through modular and

stackable education blocks. After all, we share textbooks and not everyone writes a new book for their courses. Similarly, there is an opportunity to curate modular education blocks for use across other universities. Modular education blocks partition degrees into smaller, Lego-like building blocks of learning, each with their own credentials, learning, and skills outcomes. MicroBachelors and MicroMasters Programs discussed earlier are examples of modular education blocks.

Learning platform mechanisms beyond the usual MOOC features are also needed to facilitate sharing of courses. Mechanisms include the ability of faculty at the university that is using a course created by faculty at another university to monitor the progress and obtain grades of their own students. edX Online Campus is an example of such a sharing platform.

The University of Iceland has embraced this type of modular learning by offering online summer programs this year to their students that combined modular edX course content and a final assignment. For example, the program, "Leading change: Gamification, storytelling, and superheroes to the rescue," was comprised of four different edX Online Campus courses, including courses on climate change education, gameful learning, storytelling for social change, and the rise of superheroes and their impact on pop culture. These courses came from a diverse array of universities and educational institutions, including IDB, Microsoftedu, Michigan, and Smithsonian.

Dartmouth College has also used modular content with great success. Having to make a rapid shift to remote teaching and learning in March 2020, the university leadership wanted a way to deliver learning continuity for their students, partners, and other members of their community. They also wanted to ensure that the online learning experience they provided would uphold their reputation for providing an atmosphere of rich intellectual engagement between faculty and students.

Through edX Online Campus, Dartmouth was able to gain full access to edX's entire catalog of 3000+ online courses from other top universities and companies in the edX partner network. This allowed Dartmouth to provide students, partners, and community members access to these courses as well as to their own online courses and content.

Even for Polytechnic University of Valencia (UPV), which already had significant experience in developing online content and had some of the most advanced infrastructure to support its creation, speed and scale remained a challenge when it came to making a rapid and complete transformation to online learning due to the pandemic. However, by using edX Online Campus, UPV was able to make online courses, or MOOCs, available to students within one week of closing in-person sessions. Students could choose from a variety of courses and had

the opportunity to earn certificates for their coursework. These certificates could then be used as benchmarks for awarding credit as well as standalone signals of knowledge and skill development for use with potential employers. UPV also used the diverse edX course catalog to allow students who were unable to continue their internships in-person to take online courses that aligned with the professional skills the students would have learned during their internships. During its initiative in the spring of 2020, UPV saw more than 20,000 enrollments in edX's Online Campus, and received very positive feedback from students and staff.

Access to this kind of modular content from others helps to expand online capacity for a university rapidly, and can be done during the transition period or even permanently, because at the same time it benefits students by allowing them to tailor their education to their interests or to improve their job prospects or career mobility. Modular learning also enables lifelong learning because working professionals can learn new skills in shorter amounts of time, even while they work. It also allows them to build a unique skill set for the career they want. For instance, someone can combine humanities courses with computer science, soft skills with technology skills, communication skills with coding skills, or data science and analytical skills with design skills.

As exemplified by UPV, Dartmouth College and the University of Iceland, modular content blocks also allow universities to share content not just across their own school, but across schools nationally and internationally. This gives universities more flexibility in meeting on-campus students' needs for specialized courses or programs. Platforms like edX Online Campus can be used to both host a university's content and to share its content with other schools. There are also interesting business model questions to explore here. For example, does the university using the content pay subscription fees for the content much like they do for library content today? These fees can be shared by the university supplying the content and the platform provider.

Stackable education blocks allow students to go even further, by "stacking" their modular certificates together to earn a higher level of credential, certificate, or even a full degree. The stackable certificates can even come from multiple institutions. For example, edX, ASU and MIT have partnered together to offer an innovative stackable online Master of Science in Supply Chain Management. Learners who complete and pass the MIT MicroMasters program in Supply Chain Management can then upon admission stack this credential up to earn a full Master's degree on edX from ASU's W.P. Carey School of Business and ASU Online. Both MIT and ASU are currently ranked in the top 3 for graduate Supply Chain and Logistics by *U.S. News & World Report.* (edX, 2019).

As this example shows, by utilizing modular and stackable education blocks, universities can provide students with greater flexibility and the opportunity to synthesize their education with the customized skill set they need to advance their careers. This is truly blended learning at its best.

Conclusion

Blended learning that is available before campus, during campus, and after campus facilitates access to higher education in a way that increases learning opportunities for everyone as well as improving learning outcomes. Additionally, when learning becomes integrated at every stage of a learner's life as well as integrated across the entire campus, true horizontal scaling is finally achievable.

edX and our partners are helping to reimagine education by pushing for greater adoption of blended learning. The approaches outlined here are just a few examples of how education is being – and can be – transformed. Much more potential from using a blended learning model remains to be unlocked.

References

Bebell, D., & Petersen, R. (2015). Leveraging MOOCs for credit-granting institutions: Results from a community college pilot study. *Center for the Study of Testing, Evaluation, and Educational Policy*. Lynch School of Education Boston College and 2edX/Harvard University. Retrieved July 15, 2020 from https://www.researchgate.net/publication/315410199_Leveraging_MOOCs_for_Credit-Granting_Institutions_Results_from_a_Community_College_Pilot_Study.

Burke, A. (2001). Group work: How to use groups effectively. *The Journal of Effective Teaching, 11*(2), 87-95.

Cengage. (202). *Digital learning pulse survey: Immediate priorities*. Retrieved July 15, 2002 from https://embed.widencdn.net/pdf/plus/cengage/1yhakzkaya/higher-educations-response-to-covid19-infographic-1369680.pdf/?utm_campaign=in_movetoonline_dg_fy2021&&utm_content=1373605

Cima, M., & David H. K. (2020). *Personal communication.*

Downie, J. (2020). *Personal communication.*

edX. (2019). *edX, ASU and MIT announce innovative stackable online master of science in supply chain management*. Retrieved July 28, 2020 from https://www.edx.org/press/edx-asu-and-mit-announce-innovative-stackable-online-master-of-science-in-supply-chain-management

edX. (2020). 2020 *Impact report*. Retrieved August 5, 2020 from https://www.edx.org/sites/default/files/2020-impact-report.pdf

Fry, R. (2020). Millennials are largest generation in the U.S. labor force. *Pew Research Center*. Retrieved July 16, 2020, from https://www.pewresearch.org/fact-tank/2018/04/11/millennials-largest-generation-us-labor-force/

Gelles, D. (2020). Are companies more productive in a pandemic? *The New York Times*. Retrieved January 17, 2020 from https://www.nytimes.com/2020/06/23/business/working-from-home-productivity.html.

Ghadiri, K. (2014). Developing and implementing effective instructional strategies in STEM. *American Society for Engineering Education*. Retrieved July 15, 2020, from https://www.edx.org/sites/default/files/upload/developing_and_implementing_effective_instructional_stratagems_in_stem_f_0.pdf

Goulart, J. (2019). *Finding a new career path with a professional certificate: Meet Larisa*. Retrieved July 16, 2020, from https://blog.edx.org/finding-new-career-path-professional-certificate-meet-larisa/

Joyner, David. (2018). Toward CS1 at scale: Building and testing a MOOC-for-credit candidate. *Paper presented at the Learning at Scale 2018 (L@S) Conference*, June 26–28, 2018, London, United Kingdom. Retrieved July 15, 2020, from http://www.davidjoyner.net/blog/wp-content/uploads/2018/06/Joyner-L@S2018-TowardCS1atScale.pdf

Kadlowec, J., Chen, J., & Whittinghill, D. (2005). Enhancing student learning in mechanics through rapid-feedback. *Proceedings of the IASTED International Conference on Education and Technology-ICET 2005*, Calgary, Alberta, CA, July 4, 2005, (pp. 274-279). Retrieved July 28, 2020, from https://digitalcommons.calpoly.edu/meng_fac/73/

Lederman, D. (2020a). How teaching changed in the (Forced) shift to remote learning. *Inside Higher Ed.* Retrieved July 14, 2020, from https://www.insidehighered.com/digital-learning/article/2020/04/22/how-professors-changed-their-teaching-springs-shift-remote

Lederman, D. (2020b). Presidents' growing worry? Perceived value of college. *Inside Higher Ed*. Retrieved July 14, 2020, from https://www.insidehighered.com/news/survey/college-presidents-increasingly-worried-about-perceived-value-degrees

LinkedIn. (2018). *LinkedIn's 2018 workplace learning report*. Retrieved July 16, 2020, from https://learning.linkedin.com/resources/workplace-learning-report-2018

Magda, A. J., & Aslanian, C. B. (2018). Online college students 2018: Comprehensive data on demands and preferences. *The Learning House, Inc*. Retrieved July 14, 2020 from http://www.learninghouse.com/wp-content/uploads/2018/07/OCS-2018-Report-FINALpostprintedits.pdf

Mello, F., & West, C. (2020). *What has happened when campuses shut down for other disasters? A coronavirus case study*. Retrieved July 14, 2020, from https://hechingerreport.org/what-has-happened-when-campuses-shut-down-for-other-disasters-a-coronavirus-case-study/

MIT News. (2017). *MIT pilots full-credit online residential course*. Retrieved July 15, 2020, from http://news.mit.edu/2017/mit-pilots-full-credit-online-residential-course-0612

Pearson. (2018) *Beyond millennials: The next generation of learners*. Retrieved July 14, 2020, from https://www.pearson.com/content/dam/one-dot-com/one-dot-com/global/Files/news/news-annoucements/2018/The-Next-Generation-of-Learners_final.pdf

Pearson. (2019) *The global learner survey*. Retrieved July 14, 2020, from https://www.pearson.com/content/dam/one-dot-com/one-dot-com/global/Files/news/gls/Pearson_Global_Learner_Survey_2019.pdf

Ramapriyan, R. (2020). *Leebron announces plans for fall semester: Shortened semester, dual in-person and online classes*. Retrieved July 14, 2020, from https://www.ricethresher.org/article/2020/05/leebron-announces-plan-for-fall-semester

Thinking and Acting at Scale for Internal University Services

Rovy Branon

Abstract

It is too early to understand the total impact of COVID-19 on higher education. For many institutions in the United States, the pandemic meant an almost immediate move to remote instruction, using online delivery at a scale previously considered impossible. Online learning is no longer new, but many psychological and cultural barriers to adoption have fallen as the mode became a necessity to survive. Universities have always served as mechanisms to scale education. As societal needs shift, our concept of scale must shift once again. Online learning has created an opportunity to rethink universities and position all aspects of our work so that educational equity can be increased. To be successful, we must consider scale beyond courses and degrees.

Keywords: At-scale learning, higher education, student services, COVID-19

Introduction

As we consider at-scale learning in this particular time, in the midst of a global pandemic, we must remember that all of this is very in-the-present-moment. Perspective is difficult when you are living through a major change. We are all still learning together.

When I think about the big picture around the changes we're making in response to the pandemic, and the plans we're making for terms and semesters in the immediate future, it's less about predicting or dictating, and more about wondering. Disruption is often personally uncomfortable; it's also what drives impactful change and meaningful advancements. There is value in everything we're learning as a collective group in this unique moment in history.

The knowledge we are gaining holds great potential as we look to the future of education and the need to horizontally scale across our institutions. The rapid transition has shown that there are many areas for improvement. Enhancing our team infrastructure, improving communications, and understanding that there is a learning curve for all involved, are just some of the gaps that must be improved. There also exists tremendous potential to think more broadly about how we design, with whom we design, and how those designs enhance education. We are seeing that it is possible to reach more people, in fact, almost all people, and realize the

University of Washington, rbranon@uw.edu, ORCID: 0000-0002-5545-3678

power of education to promote positive change in each student's life, in our institutions, and in society.

Scale: It's What Universities Do

Universities have long been a mechanism to scale educational opportunities. Hundreds of years ago, the advent of the printing press and architectural advancements meant that the technological infrastructures were available so that a single tutor could effectively teach many learners and not just a few wealthy family members. Even if that scale was limited to certain societal classes in centuries past, and remains out of reach for the majority today, moving beyond a single tutor teaching the children of royalty to dozens or hundreds of students in a classroom today is perhaps one of humanity's greatest innovations. Incremental improvements in the last two centuries have allowed many of the large research institutions, including the University of Washington, to exceed tens of thousands of students.

In 1876, the University of Washington was known as the Territorial University of Washington (University Libraries, n.d.) and the first ever cohort was ready for its graduation. The size of that first class was just 17 students. Only one student out of those 17 was eligible to graduate: a young woman named Clara McCarty. She was the only woman in her class, and she was the only student to graduate. Despite a 1/17 completion rate for the first cohort, the university persisted and grew. From 10,000 students in the 1940s to 30,000 in the 1970s and now, in 2020, nearly 50,000 matriculated students attend the University of Washington. This growth generally came through incremental change, only one or two percent each year. But there were times in our history when new experiments in pedagogy and practice led to dramatic increases in University of Washington student populations. After World War II, for example, UW offered night programs through its Extension Office[b] that were geared toward adult part-time students. These offerings led to substantial enrollment gains through the 1950s.

Universities all over the United States grew post-World War II and again in the 1970s as grants, loans, and other programs like the "GI Bill" were put in place to make college more affordable for veterans. But society's demands today are even more than we can deliver with our traditional approaches to scale. Rather than printing presses and impressive buildings, the new era of scale is happening because digital technology allows us to vastly increase both the pedagogical and geographical reach of our programs in different ways.

[b] University of Washington-Extension changed names several times and became Continuum College in 2016.

COVID-19 as a Force Factor

Will COVID-19 be a catalyzing event, much like the GI Bill, and open the door to an era of rapid scaling of our institutions? It is still early, but we can already see dramatic changes that have rippled across higher education. As the coronavirus pandemic arrived in the United States, the University of Washington found itself in an early COVID-19 outbreak zone. On March 9, 2020, UW became the first U.S. higher education institution to cease in-person learning and move exclusively to temporary remote instruction. The University of Washington Continuum College (UWC^2) responded to this sudden shift to remote learning by bringing nearly all its programs online in a matter of weeks.

Before that decision to move all classes to remote delivery, transitioning programs to online or distance instruction that quickly was unheard of, and any directive to do so would have been met with great skepticism. One senior leader at a large research institution noted in a private conversation, “Can you imagine a university president at a major research institution, with limited online offerings, announcing to faculty that we will make 30% of our university available online in *two years*? They [the leader] would have been driven out of the academy. And yet, we did about 90% of our entire catalog in two weeks.”

COVID-19 also has students rethinking what it means to attend college amid so much uncertainty. Unlike the Great Recession, high quality, shorter, non-degree programs are increasingly available online through top institutions. Shorter programs with clear job outcomes are increasing in popularity and anecdotes from potential students indicate uncertainty about the duration of the crisis is a factor in considering a degree or a shorter program (Inside Higher Ed, 2020). At UWC^2, we added capacity to our non-degree Career Accelerator programs (University of Washington, n.d.), which have continued to grow. Our on-demand online certificate programs are also seeing substantial growth, even in the midst of the pandemic. Some of this growth is being driven by employers looking for professional development for their employees who are working at home right now. While employer-university training partnerships are not unheard of, many business leaders are also discovering the depth and breadth of sophisticated continuing education offerings that did not exist a decade ago. There is demand and need for new forms of higher education in this moment and for the future.

So, as we think about scale, we think about COVID-19, and we think about what it's going to take for our universities to reach the 36 million adults in the United States with some college and no degree (National Student Clearinghouse, 2019), or the 93.3% (Barro & Lee, 2010a; Barro & Lee, 2010b) of people globally who do not have a bachelor's degree, it's going to take more than talking about how we scale a specific instructional innovation. It's going to take more

than firing up a video conferencing platform, putting people online, and hoping for the best. Horizontal scale is going to require us to think very differently about many aspects of the academy.

A Five-stage Process to Recovery and Reimagination

COVID-19's impact on education is still to be determined, but a new normal is emerging. In one McKinsey & Company report (Sneader & Singhal, 2020), the authors posit a five-stage process for organizations to consider as they continue to deal with the pandemic. According to the report, organizations need to prepare for these five stages: Resolve, Resilience, Return, Reform, and Reimagine. At the time of this chapter's creation, most of us are still working to resolve our current challenges and building resilience so that our organizations can survive. In some cases, we are starting to learn how to return but we are still months away from anything resembling a new stasis. Yet, there's already an incredible opportunity as we move through this process to begin to reimagine and reform our work.

Not all of our temporary changes are good for students and many are only going to help us in the moment. For example, we rapidly adapted technology platforms originally designed for business use to move classes online and discovered that mischievous students adapted quickly (some aspects of college do not change) causing some more serious, offensive instances (Redden, 2020). While our novel uses of technology might open the door to students who cannot come to campus, we must also be wary of the inequities created by online learning that may limit success for some students (Baker, Dee, Evans, & John, 2018; The Real Future of Higher Ed Is Still in High School, n.d.). We will not know for some time which students benefited and which students suffered from our rushed move to remote learning. It is not too early, however, to build on early successes and be thoughtful about how the positive experiences can be replicated

When we take time to envision a new future and consider what will create a better experience for our students, for the way we work, for how we operate as we continue to move forward in this environment, we must assess what we do at scale and what we can learn from what we're doing right now, that might help us when we are through this crisis.

What can we reimagine today at our institutions? Our answers will evolve as the COVID-19 crisis abates and we gain perspective about what worked and what did not. At the very least, we will have more faculty experienced with using the internet to deliver education and students who will provide a lot of feedback. Our goal will be to listen for both the problems we encountered and the opportunities that were created.

Institutional Instructional Design

I have been using technology to build learning environments since 1991. Despite breaking many barriers and challenging the status quo to support online learning, I have never known a moment like the one that instructional design, as a field, is facing now. Instructional design across all courses an institution has to offer requires very different thinking. Let's start with some rough calculations. Intentional Futures (The State of Instructional Design, 2016) estimates that across the country, about 13,000 people are working as instructional designers in higher education. There are 4,600 educational institutions in the United States. That equals an average of 2.8 instructional designers per institution. But we know that a few larger universities likely have dozens or hundreds of people working in instructional design. That leads us to the conclusion that there are a lot of universities that have one person, or nobody, doing that work.

So, when we think horizontally, or broadly across the institution, we should acknowledge that universities have done really well for several thousand years with very little formal instructional design support. That lack of formal support is important, because as we think about this moment when instructional designers are in high demand, it can be easy to think, "This is THE time for instructional design to shine!" However, that will only be true beyond this moment if designers can also change with the times.

Doing a few more simple calculations makes the scale of supporting online horizontally across all courses using old, one-on-one instructional design approaches appear not just daunting, but impossible. For example, the University of Washington, across three campuses in a typical spring quarter, has 7,000 total classroom courses (McQuate, 2020). Scaling our current instructional design practices for developing "true" online courses across the entire university would require 583 instructional designers. In the best of budgetary times, it is hard to imagine that institutions would invest so heavily in instructional design. Economic realities of COVID-19 may reduce, not increase instructional design support.

Regardless of whether it's online or face-to-face delivery, we must come up with new design techniques and new ways of operating. During the pandemic, some faculty, working without instructional designers, created groundbreaking instructional interventions. Having the requirement to teach online and the time to innovate is elevating digital teaching. For those faculty, the basics of online teaching will no longer be sufficient. Other faculty are completely stuck, unable to use our massified video conferencing tools to solve wicked instructional problems because they have no support beyond a helpdesk. In other words, as more faculty use digital technology to teach, they are pushing their own boundaries. As the digital teaching literacy of mainstream faculty increases, instructional design will need to change from "building

courses" to solving pedagogical challenges. The techniques and processes must also change to accommodate how these challenges are solved across an entire institution. That's going to also change the way that we operate, because it's not viable to think a university would hire 583 instructional designers to ensure quality across every course. Some techniques are emerging, but is it time to reimagine how instructional design practice scales to support online programs across the entire university, now and in the future?

Student Services

If instructional design practices must change to scale at an institutional level, student services must also change to meet more significant demands from larger, more diverse, and remote student populations. Creating a meaningful digital student experience at scale means rethinking financial aid, admissions, libraries, student research, and significantly rethinking *digital* and *blended* student life.

Prior to COVID-19, universities were just beginning to consider the needs of online and distance students in a more comprehensive way. As online student populations were growing, so were non-instructional student issues. Mental health services, already under growing strain on many U.S. campuses (Field, 2016), were also increasingly in demand by online students. Penn State World Campus was one of the first public research universities to address online student mental health at scale (World Campus Helps Students Find Mental Health Services No Matter Where They Are, 2020) and the timing could not have been better to prepare for the pandemic.

At the University of Washington's Continuum College, serving students at scale also means recognizing the complexity of choice higher education offers in 2020. Prior to the pandemic, Continuum College established an Enrollment Services team to help adult students navigate the complexity of program options and help them fit a program into their equally complex lives. These Enrollment Services Coaches are not only trained in Continuum College programs but are also trained for potentially serious situations callers may be facing. It is not uncommon for a Career Services coach to learn that someone wants to earn a credential while homeless, facing mental health challenges, or balancing impossible time commitments. While Continuum College Enrollment Services Coaches are not trained mental health professionals, knowing where to refer students and how to deal with moments of crisis appropriately became essential tools when COVID-19 hit.

At the beginning of the pandemic, the Enrollment Services Coaches were overwhelmed. But Continuum College already had plans for scaling these services by partnering with a company and cross-training employees. The handoffs between the internal coaches at

Continuum College and the private company were honed during typical busy application periods in the years before the pandemic. When the pandemic hit, having a close partner who could work seamlessly with the Enrollment Services team meant coaches could meet the increased call volume and emotional load of students now dealing with new anxieties and painful situations.

Not every example we could mention is as ready for scale. As we begin to return to our campuses, the need to blend solutions will create new challenges. Student Life units at universities around the world scrambled, and succeeded, to deliver meaningful, remote graduations in spring 2020. While graduations may not seem as critical as other services, these digital ceremonies were often the first-time distance students had the same experience as students who live on campus or who can afford to travel for graduation. As campuses returned in fall 2020, many students were still taking classes remotely. For those colleges with some students on campus, the focus became student safety, virus testing, wearing masks, and maintaining social distance but not bridging physical and digital interaction. Scale in the future will mean considering blends of student populations. Online students are unlikely to want a return to the days when they were unable to fully participate in student life because they were remote, while most of campus was geographically together and participating in activities. How will universities consider blended student populations at scale if all students want the same level of analogous services provided to campus students?

Horizontal Decision Making: Speed at Scale

We must also consider the fact that our systems, facilities and personnel are all under strains that were never part of our best contingency planning. The magnitude of decisions has been daunting and the speed with which they have been made is unlike any time in recent memory for our staid, thoughtful institutions.

These university environments often thrive on concepts of shared governance, where faculty, administration, and students debate major and sometimes minor changes for months (or years) before determining the best course of action. Such practice served universities well and maintained stability until February 2020. Already noted are the thoughts of one administrator about moving online but that was only one of hundreds of decisions during the COVID-19 pandemic: Do we delay the tenure clock? Do athletes get another year of eligibility? How will we balance the budget? What do we do about students who do not wear masks? How do we come back? The McKinsey report (Sneader & Singhal, 2020) notes that if you thought the decision process was difficult in transitioning your university to remote learning, the decision process coming out of all-remote learning will be overwhelming waves of fast decisions and changes.

The early stories from institutions in fall 2020 are confirming McKinsey's prediction (Fausset, 2020).

Some of these fast decisions will not be good ones, but let's hope that we also remember that some decisions, even though made quickly, resulted in positive outcomes. The "goodness" or "badness" of any decision is only truly knowable in hindsight. Just as our instructional designers may need to reconsider some longstanding practices to scale learning support, administrations are going to have to consider what benefits faster decision-making has for an institution now that we know it is possible. These will be fraught reflections that could challenge our practices of shared governance. This challenge does not mean eliminating or even limiting shared governance at institutions where this is sacrosanct, but new ways of practicing shared governance that increase equity, quality, and speed of decisions will matter as we scale to serve more students in uncertain environments.

Digital Leadership and Communication

Scaling vertically, within a single program or in one part of an institution, does not require substantial change in how we lead or communicate. COVID-19 is showing us that shifting an entire institution to digital delivery requires leading and communicating in new ways. Some of these new ways will be temporary, but others are creating expectations for how leaders can and should be using digital tools more effectively.

The University of Washington's Continuum College has nearly 250 full-time professional staff. Prior to COVID-19, the cadence of having an all-staff meeting was dictated by physical spaces. The building housing Continuum College only has one auditorium that seats 250, and during the school year, that space is booked continuously. A focus on physical space, even though digital tools were available, meant the entire team could only meet twice a year.

Fast-forward to March 2020 and the beginning of the pandemic lockdowns in Seattle, Washington. In that early moment, Seattle was at the forefront of early deaths from the virus. Everyone in the Pacific Northwest was fearful. Despite many unknowns, the governor of the state of Washington, Jay Inslee, moved quickly to order remote work for all state employees. University leadership immediately adhered to the requirements, but recommendations and best practices for implementation were changing daily or even hourly. Preparing refined email communications that go through multiple rounds of revision over days or weeks was no longer sufficient leadership communication.

As vice provost of Continuum College, I decided to hold an emergency all-staff meeting using videoconference on the first Friday of the lockdown. The University of Washington had just finalized a contract with Zoom earlier that week, giving the capability to hold a digital

meeting with up to 300 participants. The content consisted of repeating the official statements coming from the university and an “Ask Me Anything” format. In addition to simply sharing existing rules about required practices, we gave science updates from our Schools of Medicine and Public Health. That first digital all-staff meeting also included moments of levity – often leaders poking fun at their own challenges with the technology. An hour after the meeting, the first email came from a staff member, “I did not realize until this afternoon that I had not laughed in 10 days. I needed this more than you can imagine.” And another a few moments later, “Getting to see all of my colleagues made me feel so much less alone.” Several more emails came in. Only one mentioned an appreciation of the latest information. The rest of the emails that came in that afternoon were about the need to feel socially connected to the organization when we were forcibly separated.

The University of Washington Continuum College leadership team began to think intentionally about how we need to vary our leadership communication, not just to share information, but to feed the emotional and social needs of our employees. As we think about using digital technology to scale the delivery of programs, leaders must also consider how institutions will horizontally scale existing leadership practices and create new ones, to maintain a healthy and functional team. In January 2020, we were planning two all-staff meetings for the year. Now the team gathers every Friday for optional “Fireside Fridays.” Staff have indicated that this is a practice they want to continue, even after the pandemic subsides.

Colleagues across the country describe using more digital tools for leadership communication and collaboration than ever before. In many cases, these tools are already available in our environment but there had never been a catalyst worthy of time needed to try something new. Many of the lessons we are learning about how we work can also be applied to our classrooms and other aspects of university services. Which will remain? What are we discovering about our leadership and communication practices that will be more than a temporary fix to the pandemic? What will current and future employees demand from leaders after these experiences? These are all questions that deserve time and intentional thought, even while the future remains uncertain.

Looking Forward

We are in the middle of making history. Future generations will look back at those of us who lived through this time with awe. And yet, perspective is always elusive in the moment. In the midst of resolving the current crisis and giving our institutions the resilience to survive, we have the opportunity to reform and reimagine how our institutions can become more open and

equitable for everyone. Processes long believed to be etched in stone have proven to be as changeable as those created by a word processor.

Let's remember that our understanding of providing high quality higher education at scale is as rooted in our moment as Clara McCarty and the other 16 students (and one professor) were in 1876. Could a professor with 17 students envision a 50,000-student research and teaching institution? What level of scale might we struggle to imagine is possible from the 50,000 we serve students today? What level of scale does society need from us?

References

Baker, R., Dee, T., Evans, B., & John, J. (2018). Bias in online classes: Evidence from a field experiment. *Center for Education Policy Analysis*. Retrieved August 3, 2020 from https://cepa.stanford.edu/sites/default/files/wp18-03-201803.pdf

Barro, R., & Lee, J. (2010a). International data on educational attainment: Updates and implications. *Harvard Dataverse*. Retrieved October 5, 2020 from https://doi.org/10.7910/DVN/QGMKBL

Barro, R., & Lee, J. (2010b). A new data set of educational attainment in the world, 1950–2010 (Working Paper No. 15902). *National Bureau of Economic Research*. Retrieved from https://www.nber.org/papers/w15902.pdf

Fausset, R. (2020). Outbreaks drive U.N.C. Chapel Hill online after a week of classes. *The New York Times*. Retrieved September 15, 2020 from https://www.nytimes.com/2020/08/17/us/unc-chapel-hill-covid.html

Field, K. (2016). Stretched to capacity what campus counseling centers are doing to meet rising demand. *The Chronicle of Higher Education*. Retrieved September 30, 2020 from https://www.chronicle.com/article/stretched-to-capacity/?cid=gen_sign_in

Interest spikes in short-term, online credentials. Will it be sustained? (n.d.). Retrieved September 6, 2020 from https://www.insidehighered.com/news/2020/08/27/interest-spikes-short-term-online-credentials-will-it-be-sustained

McQuate, S. (2020). 'Hands-on' classes online? How some instructors are adapting to a new teaching environment. *UW News*. Retrieved August 3, 2020 from https://www.washington.edu/news/2020/04/16/how-to-move-hands-on-classes-online/

National Student Clearinghouse. (2019). *Some college, no degree a 2019 snapshot for the nation and 50 states*. Retrieved September 15, 2020 from *https://nscresearchcenter.org/some-college-no-degree-2019/*

Redden, E. (2020). *'Zoombombing' attacks disrupt classes*. *Inside Higher Ed*. Retrieved September 15, 2020 from https://www.insidehighered.com/news/2020/03/26/zoombombers-disrupt-online-classes-racist-pornographic-content

Sneader, K., & Singhal, S. (2020). *Beyond coronavirus: The path to the next normal* (Rep.). Retrieved July 15, 2020 from https://www.mckinsey.com/~/media/McKinsey/Industries/Healthcare%20Systems%20and%20Services/Our%20Insights/Beyond%20coronavirus%20The%20path%20to%20the%20next%20normal/Beyond-coronavirus-The-path-to-the-next-normal.pdf

The real future of higher ed is still in high school. (n.d.). https://www.educationandcareernews.com. Retrieved October 14, 2020, from https://www.educationandcareernews.com/future-of-higher-education/how-to-fix-the-inequities-in-americas-education-system/#

The State of Instructional Design. (2016). *Intentional futures*. Retrieved October 3, 2020 from https://intentionalfutures.com/work/instructional-design

University Libraries. (n.d.). University of Washington. Retrieved October 2, 2020, from https://www.lib.washington.edu/specialcollections/collections/exhibits/site/early

University of Washington. (n.d.). Retrieved October 15, 2020 from https://www.pce.uw.edu/career-accelerator-certificates

World Campus helps students find mental health services no matter where they are. (2020). Penn State University. Retrieved July 15, 2020 from https://news.psu.edu/story/616094/2020/04/20/campus-life/world-campus-helps-students-find-mental-health-services-no

EPILOGUE

Learning at-Scale, Affordability, and Access in a Post-COVID19 World

Yakut Gazi[a], Nelson Baker[b] and Karen Sibley[c]

In his opening comments for this publication, Peter Stokes (2021) asks us:

- "[W]hat lessons will higher education draw from this experience and this history?
- How might the remarkably rapid adaptations in our approach to instruction, often achieved in a matter of days or weeks and under the threat of almost unprecedented public health, economic, and social crises, leave a lasting mark on the future of higher education?
- What, in other words, has COVID-19 taught us about higher education?
- And what will we do differently as a result?"

The essays in this volume and many other stories from the 2020 global pandemic illustrate the challenges of urgent horizontal scale in technology mediated instruction. Many say this experience will serve to accelerate instructional change long underway and perhaps to put the ultimate spotlight on issues of equity, access and cost. As they look toward the post-COVID future our authors coalesce around the compelling necessity to develop a stable and dependable ecosystem of learning technologies enabling the talent resources and expertise to guide and support faculty, create meaningful learner engagement, and pursue new opportunities for effective, accessible, affordable higher education.

Many organizations represented in this volume had either achieved or were well on their way to creating extremely affordable programs that are vertically at-scale, serving volumes of students unimaginable in a residential setting. Georgia Tech, for example, has been operating in the distance education realm since 1977, expanding its experience in the Massive Open Online Courses (MOOC) era circa 2012 and in 2014, launching the world's first online computer science degree at scale, at a tuition price point less than $7K (Georgia Tech News Center, 2014). This program grew from 1,255 students in its inaugural fall to 10,559 in fall 2020. This

[a] Georgia Institute of Technology, yakut@aggienetwork.com, ORCID: 0000-0001-6988-1887
[b] Georgia Institute of Technology, nelson.baker@pe.gatech.edu, ORCID: 0000-0001-9913-3230
[c] Brown University, retiree, Karen.H.Sibley@gmail.com, ORCID: 0000-0001-5287-7945

program enrolls seven percent of all of the master's degrees awarded in this field in the US (Goodman, Melkers, & Pallais, 2017), creating significant access for individuals largely unable to access and/or afford such education before. Our work in this area has expanded and today, seventy percent of Georgia Tech's graduate students are online (16,247 out of 23,210) with the majority being part-time students who are working adults and online enrollment represents 40.8% of the overall enrollment of 39,774 in Fall 2020 semester. Experimentation and development for the capacity to produce excellence in online education was already happening at Georga Tech pre-COVID. The pandemic pushed us into overdrive.

Does recent experience provide the impetus to explore and expand the impact of the methods employed by these programs in application to the horizontal scaling of learning, provoked by the urgency of the pandemic, that can also help to achieve affordability and accessibility goals? Is it possible to develop the technology and talent services to achieve both horizontal and vertical scale without a concomitant linear increase in cost as student numbers increase? Can a more diverse learner population (including geographic, ethnic and age/career stage) be better served if both horizontal and vertical scale exists? These questions and more will drive conversations, strategy, experimentation and change for many years to come.

We hope this book, written during the year of the COVID-19 pandemic in 2020, will provide a historical account that will contribute to informed and rapid change expected across the education landscape. The work of innovation in higher education and embracing learner-centric cultural and operational tactics and enabling our students to benefit from accessible, quality learning experiences in a radically affordable manner, is just beginning.

The pandemic quickly plunged both faculty and students into the unknown. Access to physical campuses and classrooms was eliminated in the middle of the 2020 spring semester, with only limited access eventually resumed after months of detailed planning for social distancing and lower density instructional spaces. Often even when some students returned to residential instruction, faculty were also teaching many others continuing to study online. According to the Quality Matters CHLOE survey, when COVID-19 hit 50% of faculty, 51% of undergraduate students, and 27% of graduate students in U.S. institutions had never taught or learned online (Garrett & Legon, 2020). In addition, as Branon from the University of Washington shares (2021, in this volume), across the US there were estimated to be fewer than three instructional designers per institution leaving faculty at almost all institutions to struggle on their own with unfamiliar technology and urgent demands under emergency circumstances. While disconcerting to say the least, the urgent and broadly shared crisis created an environment ripe for innovation. Education has been irreversibly changed.

Stakeholders around the globe and across all levels of education experienced significant discoveries as a result of the very difficult emergency response dedicated to maintaining instruction in 2020. Many who had not previously been involved in the use of technology in teaching and learning developed new recognition of the enabling effect of pre-COVID readiness, the importance of ease and single point of entry for faculty and student support, the value of cross-unit alliances to support the instructional endeavor, the realization that not everything scales (horizontally or vertically), and the need for alignment between policy and technological advances. We, and others, also benefited greatly from knowledge sharing between other higher education institutions through the network established by our Georgia Tech's annual "Affordable Degrees at Scale" symposium (see Affordable Degrees at Scale Symposium, 2020).

From institutions like the University of California Davis, Louisiana Tech and Georgetown University (Schwedler; Johnson and Hoover; Otter and Ray, in this volume) we benefit from accounts of essential strategic approaches to building and sustaining a structure to support vertical and horizontal scaling of instruction and learning during and after COVID. They emphasize the criticality of embracing institutional values in determining strategy. In Maryland, Bishop et al (2021, in this volume) further expand on a strategic approach at the university system level, where multiple institutions and their values and priorities need to be considered in order to inspire cultural transformation and enable innovation. For innovation to "stick", the long established and comfortably familiar model of instruction will need to flex, embracing new understanding and possibility illuminated by the crisis.

As faculty across the country continuously improve their online teaching capacity and comfort, we expect they will discover many superior aspects of hybrid approaches as opposed to the simple choice between exclusively online or residential instruction. Anecdotally, many faculty are already expressing a desire to continue to be able to teach online/hybrid post-COVID. Even when pandemic risks recede, the convenience offered by technology will be hard to give up. There are institutional, state, regional, and federal policies and guidelines that will need to be considered, rethought, or challenged to enable faculty along this innovative path. We hope to also see efforts at graduate schools to provide learning sciences, online pedagogy and technology skills for future faculty.

At Georgia Tech a key achievement in producing vertical scaling of learning is the unique structural and business model that focuses on economies of scale. These programs attract a large number of students, generating larger than usual revenue, while keeping many costs, including those for faculty, fixed or not increasing linearly. This is done by increasing the faculty-student ratio while utilizing additional instructional personnel (teaching assistants,

graders, instructional designers and technologies) to maintain delivery quality and the quality of the student experience. “At scale” courses and programs are designed and built to effectively address a “many learners” model.

In contrast, standard practices in residential instruction are structured so that more students require more courses, more faculty and more classrooms in addition to the myriad other services a residential campus must provide, hence always more cost that can imbalance the business model. The 2020 pandemic experience of horizontal scaling of technology-based instruction reproduced the traditional business model of typically small numbers of students across many courses with parallel increases in cost of operation. Surendran and Vinod; Lee et al; Joyner; Scagnoli and Maurer (2021, in this volume) describe how critically important the pre-COVID vertical at-scale innovations were to their institutions' abilities to respond to the pandemic. Now we should explore other factors in sustained improvement post-emergency.

The horizontal scaling of learning using digital technologies has not been a widespread phenomenon pre-COVID. This type of scaling feels out of place against the backdrop of our traditional college experience, so it faces cultural pushback. If horizontal scaling of online learning continues to engage the “many instructors” model, effective teaching preparation and support of these faculty becomes essential and should benefit from lessons learned from the vertical at-scale approach. For example, in vertical at-scale learning the courses are typically designed by a team of specialists and courses, or elements of them, are reused for a number of semesters. To reduce cost and improve quality in horizontal scaling, faculty will ultimately need to embrace the role of the course designer and creator since insufficient specialist capacity exists and increasing these resources will increase costs. Georgia Tech had a large group of faculty teaching in our online courses pre-COVID and some of these individuals were able to advise, guide, and act as resource partners for their less experienced peers. During the pandemic many institutions began to deploy a train-the-trainer model to improve faculty capacity with the pedagogy and tools essential for quality online instruction. Can a next step include the reuse of courses or components of courses developed during the COVID-19 period to create cost efficiencies?

Though we had a stable technology ecosystem in place to support online instruction, the pandemic quickly identified challenges. For example, some services were only provisioned and licensed for specific online programs, such as proctoring solutions or robust enterprise video recording and editing solutions. Adding to the initial issues of gaps in enterprise technology infrastructure, as in many other large institutions, the human capital supporting faculty teaching is distributed in multiple units at Georgia Tech. Under the leadership of Georgia Tech

Professional Education (GTPE) an alliance was quickly formed with key units to create a single point of entry for support requests, and what later proved to be more important, a nexus of expertise that will provide faculty development programs and offer guidance. The Office of Information Technology, the Center for 21st Century Universities, the Center for Teaching and Learning, and the Libraries are the key partners of this alliance. Asynchronous and synchronous programs and resources developed through this partnership marked the key contribution to Georgia Tech's effectiveness in remote/online and hybrid learning in 2020. This alliance, dubbed the Georgia Tech Remote and Hybrid Teaching Academy, released many of these resources to the public under the Creative Commons license (Georgia Tech Remote and Hybrid Teaching Academy Open Access, 2020).

Across the nation, early data in spring 2020 did not instill confidence in remote learning. In one study of 1000 students, 75% of students said that their e-learning experience was not of quality (OneClass Blog, 2020). In another national study of 14,000 students only 15% thought their online classes were as effective as in-person classes (Patch, 2020). As we moved towards the fall 2020 semester, many Georgia Tech students – and parents – demanded that we offer engagement opportunities for students, preferably through safe in-person gatherings, as opposed to just asynchronously or synchronously delivered lectures. However, as many of us saw in the fall semester, students wanted to come back to campus, but did not necessarily flock to the classrooms even when their classes had the option of in person attendance. They complained about isolation because even when they attended classes in person, often they lacked the opportunities for meaningful interaction with the breadth of students at the same time, in the same place, as they once had done. The American college experience is largely defined by the in-person immersion in the study halls, workouts at the gym, hanging out at the fraternity/sorority establishments, and participation in the campus community at large. When campuses shut down and attempted to offer online instruction to replace campus life, many institutions faced class-action lawsuits, demanding pro-rated tuition or full reimbursement (Binkley, 2020; Cappelino, 2020). Many colleges found themselves in the deepest financial trouble of their existence due to declining enrollments and reimbursements issued for no-longer-offered campus services (Binkley and Amy, 2020).

We argue that the "wicked problem" which COVID-19 presented to us in higher education is the rethinking of the student experience. Branon (2021, in this volume) discusses the importance of scaling up university services, emphasizing *student* services. While demand for meaningful in-person experience continues, we do not think that the prevalence of on-campus lecture pedagogy will spring back to its pre-COVID status, nor do we think it should.

Better quality online instruction and increased acceptance of this mode of instruction is likely to encourage students to reject the traditional in-classroom lecture which can easily and more comfortably be consumed online. Our campuses will need to be designed for full and meaningful engagement that requires physical presence and optimizes both student learning and quality use of their time. Agarwal (2021, in this volume) argues that the future of learning is blended. For many years instructional designers and learning scientists have advocated flipped and inverted learning, where content delivery and lower-level cognitive learning is pushed online while the classroom is used to engage in discussion and analysis. While this is not a novel concept, COVID-19 is likely to be the precipitating event to bring inverted learning to centerstage. In a similar fashion to the way "MOOC mania" circa 2012 invigorated and propelled the field of online learning that had been in existence for a good 20 years, perhaps the 2020 pandemic will precipitate long-recommended changes in instructional design and learning on campus.

Another significant question is that of who is left behind when the classic "American college experience" is unattainable for many. COVID-19 exacerbated the differential effects of income, race, gender, and socioeconomic background on student success (Anderson, 2020). Inequitable differences in access to stable and high-quality internet, also hit the spotlight. While basic services like electricity, transportation and television are assumed, perhaps the time to assume the need for internet access has now arrived. The public and policy makers should demand more on both the infrastructure and access fronts. Education policies and practices have fallen behind the rapid changes in technology and its potential. We need to pay close attention to the chasm that virtual education has created, or perhaps simply illustrated and worsened. As we look at 2021 and beyond, we need to be thinking about broad and equitable access to education for students of all ages to enable social achievement, job readiness and quality life experience.

This volume and its many contributors illustrate often heroic response to a crisis of urgency while they also represent the many across higher education who stand ready to participate in, lead and effect the coming changes in higher education and the way in which it serves society.

References

Affordable Degrees at Scale Symposium. (2020). Retrieved on January 20, 2021 from https://pe.gatech.edu/events/virtual-degrees-at-scale.

Agarwal, A. (2021). The future of learning is blended. In Y. Gazi, & N. Baker (Eds.), *Moving horizontally: The new dimensions of at-scale learning in the time of COVID-19.* http://hdl.handle.net/1853/64299

Anderson, G. (2020). More pandemic consequences for underrepresented students. *Inside Higher Ed.* Retrieved on January 3, 2021 from https://www.insidehighered.com/news/2020/09/16/low-income-and-students-color-greatest-need-pandemic-relief.

Bishop, M.J., O'Neill, N., & Walsh, P. (2021). Fostering a culture of academic innovation in a time of crisis. In Y. Gazi, & N. Baker (Eds.), *Moving horizontally: The new dimensions of at-scale learning in the time of COVID-19.* http://hdl.handle.net/1853/64295.

Branon, R. (2021). Thinking and acting at scale for internal university services. In Y. Gazi, & N. Baker (Eds.), *Moving horizontally: The new dimensions of at-scale learning in the time of COVID-19.* http://hdl.handle.net/1853/64300.

Binkley, C. (2020). Unimpressed by online classes, college students seek refunds. *ABC News*. Retrieved on January 5, 2021 from https://abcnews.go.com/Politics/wireStory/unimpressed-online-classes-college-students-seek-refunds-70483390)

Binkley, C., & Amy, J. (2020). *Financial hits pile up for colleges as some fight to survive*. Retrieved on January 5, 2021 from https://apnews.com/article/673bffcda00bf5522153c15e6e0373d5.

Cappelino, A. (2020). More than 75 universities sued for refunds following COVID-19 campus closures. *Expert Institute.* Retrieved on January 3, 2021 from https://www.expertinstitute.com/resources/insights/universities-sued-for-covid-19-refunds-following-campus-closures.

Chin, M. (2020). Exam anxiety: How remote test-proctoring is creeping students out. *The Verge*. Retrieved on November 4, 2020 from https://www.theverge.com/2020/4/29/21232777/examity-remote-test-proctoring-online-class-education .

Garrett, R., & Legon, R. (2020). *CHLOE 4 Navigating the mainstream: The changing landscape of online education*. Retrieved on December 28, 2020 from https://www.qualitymatters.org/sites/default/files/research-docs-pdfs/CHLOE-4-Report-2020-Navigating-the-Mainstream.pdf.

Georgia Tech Covid-19 Exposure and Health Alerts (2020). Retrieved on December 28, 2020 from https://health.gatech.edu/coronavirus/health-alerts.

Georgia Tech News Center (2014). *Georgia Tech launches world's first massive online degree program*. Retrieved on January 7, 2021 from https://www.news.gatech.edu/2014/01/15/georgia-tech-launches-worlds-first-massive-online-degree-program.

Georgia Tech Remote and Hybrid Teaching Academy Open Access (2020). Retrieved on January 11, 2021 from https://gatech.instructure.com/courses/152012.

Goodman, J., Melkers, J., & Pallais, A. (2017). Can online delivery increase access to education? *Journal of Labor Economics, 37*(1), 1-34. Retrieved on January 3, 2021 from https://scholar.harvard.edu/files/pallais/files/onlinedelivery_01.pdf.

Johnson, D., & Hoover, T. (2021). Louisiana Tech University today and sprinting towards tomorrow. In Y. Gazi, & N. Baker (Eds.), *Moving horizontally: The new dimensions of at-scale learning in the time of COVID-19.* http://hdl.handle.net/1853/64294.

Joyner, D. (2021). Mechanisms for supporting emergency remote classes: Towards a distributed classroom. In Y. Gazi, & N. Baker (Eds.), *Moving horizontally: The new dimensions of at-scale learning in the time of COVID-19.* http://hdl.handle.net/1853/64291.

Lee, J., Lisle, M., & Courville, T. (2021). Adapting vertically-scaled solutions across many Georgia Tech classes. In Y. Gazi, & N. Baker (Eds.), *Moving horizontally: The new dimensions of at-scale learning in the time of COVID-19*. http://hdl.handle.net/1853/64296.

OneClass Blog (2020). *Seventy-five percent of students unhappy with the quality of elearning during COVID-19.* Retrieved on January 5, 2021 from https://oneclass.com/blog/featured/177356-7525-of-college-students-unhappy-with-quality-of-elearning-during-covid-19.en.html.

Otter, K., & Ray, S. (2021). Strategic leadership and partnerships to scale a remote teaching infrastructure rooted in Jesuit values. In Y. Gazi, & N. Baker (Eds.), *Moving horizontally: The new dimensions of at-scale learning in the time of COVID-19.* http://hdl.handle.net/1853/64292.

Patch, W. (2020). *Impact of coronavirus on students' academic progress and college plans. Niche*. Retrieved on January 5, 2021 from https://www.niche.com/about/enrollment-insights/impact-of-coronavirus-on-students-academic-progress-and-college-plans#college.

Scagnoli, N., & Maurer, M. (2021). Horizontal scaling: How experience in MOOC programs helped a college strategy in emergency response. In Y. Gazi, & N. Baker (Eds.), *Moving horizontally: The new dimensions of at-scale learning in the time of COVID-19.* http://hdl.handle.net/1853/64290.

Schwedler, J (2021). Jumping the great chasm to quality online learning at scale: Strategic change management in a time of crisis. In Y. Gazi, & N. Baker (Eds.), *Moving horizontally: The new dimensions of at-scale learning in the time of COVID-19.* http://hdl.handle.net/1853/64293.

Stokes, P. (2021). Foreword. In Y. Gazi, & N. Baker (Eds.), *Moving horizontally: The new dimensions of at-scale learning in the time of COVID-19.* https://smartech.gatech.edu/handle/1853/64285.

Surendran, A., & Vinod, C. (2021). Horizontal scaling of online learning in the post-COVID19 society: Reflections from Kerala. In Y. Gazi, & N. Baker (Eds.), *Moving horizontally: The new dimensions of at-scale learning in the time of COVID-19.* http://hdl.handle.net/1853/64298.

In this volume: